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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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VOL. CXLV., No. 2910.] TUESDAY, FEBRUARY 18, 1919. [71ST YEAR.

EDITORIAL NOTES.

Looking Forward from the Platform of To-Day.

RELEASED by the cessation of hostilities, the Chairman of the South Metropolitan Gas Company (Mr. Charles Carpenter, D.Sc.) last Wednesday related the tale of the part, or rather the parts—there are several—that the Company has taken in serving the country in the war, by putting at its command man power, technical skill, plant, and processes. The scope of service was extensive; its character diverse. It made gratifying hearing, as it will make gratifying reading. It is a revelation of the resources of a gas undertaking, while labouring under conditions disordered, misshapen, and burdensome as were those of war time, and as they still are. The Company, too, has suffered more grievously in proportion than have other ship-owning gas companies from the loss of boats bringing coal from the North. The sinking of ten ships, and what is more deplorable the loss of gallant lives, is no light matter; and the anxiety and the financial exactions of such losses cannot by those outside be put into actual form, but can only be imagined. The Chairman mentioned the fact that the Company tar-washed their gas for the recovery of benzol and toluol; there was no mention of oil-washing, apart from the indirect one (which the general proprietors would not appreciate) through a reference to the paragraph of the report which stated at the end that the Company had expressed its willingness to depart during the war from its practice of supplying gas of standard quality if required to do so by the authorities to meet a national emergency. That the Company did not oil-wash their gas does not depreciate in the slightest the other invaluable services that they rendered to the State and the community. As, however, was pointed out last week, the fact that the Company were not desired to oil-wash their gas was due to the needs of the nation in this regard being met by other concerns; and therefore, whatever merit attaches to the continued supply of the standard gas in South London, should be a distributed award, and not be credited solely to persistence in a line of policy that was adopted long before the war brought the changes from which the industry has suffered, and will suffer long into the future, if it is unable to bring its operations into line with new circumstances.

Interesting as were all parts of the address, the one which will be read with the keenest technical relish is that in which the Chairman referred to the question of the quality of gas. There is nothing in what he said that indicates that he personally is likely to be induced—at any rate, as he at present sees things—to cast his vote in favour of a lower calorific power than that which the Company are at present supplying. But there are signs in what he said that his attitude should not be taken as an arbitrary one, or as involving all conditions of supply. He believes that what he is doing at present is the right course. But what is to be the destiny of the industry in regard to the economical manufacture of gas—what is to be the final solution of the problem—is not yet known. We hope our understanding of his attitude is a correct one; and we think it must be, or the Chairman and his colleagues would not perhaps have otherwise seen sufficient value in the work of the Board of Fuel Research to warrant them in affording the Board for their investigations the generous facilities they have done at the East Greenwich Gas-Works. The Chairman's view is that whatever is done in the present should not ignore the protection of the future. There are different opinions current as to the best mode in which to protect the future of gas supply. The broader our outlook, the more extended our logical survey as to this, the better. The outlook cannot be limited to existing local conditions of use; otherwise local conditions may in future suffer. In the address, there were mentioned as concomitants of lower calorific power gas, the necessity for more storage, purification, and larger distribution plant. If need insists, the additional plant must be provided, and higher pressures must obtain. Change cannot go on all around us, without necessitating change on our own part. There are areas where such considerations have formed no disability during the war in the distribution of lower calorific power gas. The continued use of flat-flame burners in situations where incandescent lamps (gas and electric) cannot survive, was also mentioned. The percentage of gas that is used for purposes other than flat-flame lighting suggests that what is wanted is not the sacrifice of any particular economy to continued luminosity of gas-flame, but the setting to work of invention with the view to provide an incandescing medium which will stand vibration, though giving a low efficiency, compared with other incandescent gas-burners.

We have to look beyond such conditions, and consider what the times prognosticate. Coal is going to be dearer than in pre-war days, labour is going to be more costly, all forms of material are in consequence going to be more expensive. The ratio of expenditure to gas production on the old lines is going to be altogether altered. New carbonization schemes for purposes other than gas supply are coming into the field; and large quantities of coal will be demanded by them. Coal conservation is simultaneously being sought. Heating gas will be wanted more and more; and this gas need not contain the ingredients that will be useful to the country for power purposes. The commercial position of residual products may be seriously affected. There are also the Government electric supply schemes. The Chairman referred to them, and protested against the Government fostering and encouraging electricity in a way which would give it any undue advantage over the gas industry, which deals with the heat energy of coal to much better advantage. These are among the considerations that have to be brought into view and placed in the balance, as well as storage, purification, distribution, and flat-flame burners. What is the industry going to do to meet them? Turn the matter over in mind as we will, examine with care every facet of the position of which we can think, there seems to be no other way (so far as current knowledge enables an estimate to be made) of meeting the situation which will arise out of current circumstances than by putting more B.Th.U. into the gas-mains per ton of coal handled. We do not dispute that in some cases gas sold at 3s. 6d. per 1000 c.ft. may be dearer than gas at 4s. It is equally true that gas at 4s. may in some cases give no better efficiency than gas at 3s. 6d., and even lower. We can imagine in the time to come, when matters settle down on their new foundation, the difference being larger than 6d. between coal gas and debenzolized coal gas containing a percentage of water gas. Then the B.Th.U. placed at the disposal of the consumers by the cheaper gas for a given sum would be considerably greater. With electricity at 1d. or 0·5d. per unit for heating, good combustible gas at 2s. 6d., 3s., or even 3s. 6d. would be more attractive to the general public than gas at 4s. We are by no means tied to any particular calorific standard. One would be foolish to pin oneself to figures, in face of the exploration that is now proceeding—not only in manufacture, but utilization. The responsibility of the Government in this matter is, no doubt, great. The responsibility extends not only to the gas industry, but to the general public, and to the ensuring of the best use being made of our

native coal supplies. The responsibility of the gas industry is likewise considerable.

For the South Metropolitan Company, the position appears to be: Expenditure is going to continue high; the price of gas will thus have to be higher than before the war. Limiting the production of gas per ton of coal and maintaining the calorific standard and the supply of coal gas without admixture with any other gas, the price will have to be proportionately higher in comparison with some other concerns, unless the Chairman and his technical staff have some manufacturing surprise which they are going to spring upon the industry. As things present themselves, there will have to be a considerable revision of financial conditions before the proprietors of the Company can get back to their pre-war dividend, and the market value of their stocks be restored. So there will have to be in other gas companies; but a question of degree emerges here, which will, there is good reason to think, have some relation to the use to which every ton of coal purchased and handled is put. The gas industry is in a position now where it has to decide on a new policy; and even some well-cherished ideals will have to go by the board.

The Serious Coal Position.

WE are inclined to think that dealing with industrial disputes on a national basis is proving a national calamity. It offers facilities for raising matters *en masse* which did not before exist; and of this sections of industrial workers are taking full advantage, to the disadvantage of the country at large. But the principle, having been established, has to be accepted; and collective action has been pushed forward with such perseverance by trade unions that alliances have been formed to bring about the acutest pressure where, in their wisdom or otherwise, it is considered by the unions to be needed to make the country toe the line, however unreasonable its placing may be. That is the position; and comparatively little has been done to keep pace with a tendency which is begetting disaster for the whole country, including the workers themselves. On almost every side to-day, we see the power given by numbers and training being wielded in an autocratic manner without responsibility or any sane appreciation of the inevitable results of the crude claims and forms of action which are being adopted. The miners have taken up a dictatorial *rôle*. Demands that are made by them are to be complied with without any investigation or question. They themselves are the only tribunal allowed by them to have a voice in decision—no matter how much the community generally are concerned in the issues and results. The effects of their present demands would be to bring misery on the whole community by crippling industry, and pushing up the costs of production to levels which cannot be borne without damaging the economic position of the whole country. The demands, if conceded, would be of permanent seriousness; but the flagitious decision of the Executive of the Miners' Federation and the conference of delegates from the different mining districts to take a ballot on the question of going to the extreme of a national coal strike, from March 15 next, to compel compliance with their commands, is a matter of immediate gravity, in view of the perilous position of the country in the matter of available supplies. The gravity is not lessened by the fact that an alliance exists between the miners and the railway men and transport workers, who are in a techy mood just now, and have also a list of wants that await satisfaction on their own terms.

The requirements of the miners are well known. They ask for a 30 p.ct. advance of wages, and a six-hour day, which means 25 p.ct. more wage payment (on top of the 30 p.ct.) to add to the cost of production. They desire full rates of pay for demobilized miners; and they insist upon the nationalization of the mines. Concerning the whole of the community and not the miners only, these are matters which cannot be settled off-hand without some regard to consequences. But the miners say they are to be. They have spoken; and there decision rests. The reasonable offer of the Government is contemptuously rejected. Nothing but the carrying out of the demands to the letter will satisfy. The Government offered an immediate increase of 1s. a day, consistent with the addition to the cost of living since the settlement was arrived at in June of last year. The miners reject this, and avow their object to be to raise the standard of living in the mining areas above both the present standard and the pre-war standard. What their final idea as to a standard of living is likely to be is a profound secret. Already the miners are being paid 73 p.ct. of the cost of coal production; so that, in the published manifesto of the Miners' Federation there is not much point in the reference to the increase in the cost of pit props and other items of expenditure on production. If also the miners' submission is true, that the attitude of the Government is due to a desire to maintain their hold on excess profits from coal, then this is more a question for the public than for the miners. What should be, but is not, the extent of their concern is to get a fair day's pay for a fair day's work. The workers at the coal faces are earning approximately £1 a day, and other classes of employment about the mines are receiving more than one-half to three-quarters of this figure. These cannot be regarded as bad payments, even admitting the uninviting character of the work. But sentiment can be carried too far. Avoidable absenteeism has shown that a good proportion of the miners have no innate aversion to leisure, and take steps to ensure personal indulgence in it to an inordinate degree. As to the payments to unemployed demobilized miners, the Government intimated that they could not deal with them in a manner which gave them preferential consideration over demobilized men whose work is in other spheres. This the miners regard as a negative attitude, and submit that it does not prove the claim to be unjust. They now go further, and say it should be made applicable to the whole of the demobilized workers of the country who are not given employment which restores them to the condition they would now have been in had they not joined the country's forces.

In respect of other matters, the Government proposed a course that should have given pride to the miners. The suggestion was to refer to a Committee for investigation and report a number of questions—such as wages and hours of the various grades of colliery workers, selling prices and profits, royalties and wayleaves, production and distribution, general organization of the industry, as well as nationalization. There are questions here that are political ones of national and not merely sectional importance; nevertheless the Government suggested that on the Committee the miners should have their own representatives. With the miners' representatives there, evasion of a thorough investigation would have been impossible, even if it entered the heads of other members of the Committee to abuse the trust reposed in them. In other respects the miners' representatives, as has been seen, are quite candid regarding their aims and ambitions; but in connection with this one, they display abject weakness. The matters in question are not ones for arbitrary treatment; they require full judicial investigation, consideration, and decision. The miners' representatives cannot advance anything better against the suggested plan of dealing with them than to say that the Government plan is simply one for delay—in other words, they accuse the Government of subterfuge. This is folly, which is sufficiently condemned by the composition of the proposed Committee. Where is the evidence that the miners themselves have made any ordered investigation to establish the soundness of their claims, or to see whether they harmonize with the interests of the whole of the country, including those of workers in other industries and spheres? What they have not done, the Government propose to do—establishing coincidently the precedent of having the workers represented on the tribunal itself. What could be fairer? What could be more in accord with the democratic spirit that is abroad to-day? By other sections of the community, the rejection of the offer by the miners' representatives will be interpreted as fear of investigation. They cannot escape this. Where claim is just, the miners nor anyone else need not flinch at inquiry—in this case, with the miners themselves constituting part of the investigating committee.

Upon the country comes this critical position—brought about by one section of workers only—almost immediately following the Prime Minister's appeal in the House of Commons for unity and confidence in the industrial world, his assurance that it is the intention of the Government to do justice to all interests in industry, and his warning that a Government who really govern must treat of these matters not only justly, but firmly when men are out to injure the national interests by selfishness. If the miners in the ballot now about to be taken follow the counsel of their leaders, and if unfortunately nothing comes to divert the feared course of events, within a month we shall be in the throes of one of the gravest industrial disturbances ever experienced. May the country be spared this.

Surprise Reductions.

REDUCTIONS in the price of gas are rare in these days of advanced and still advancing production costs; and, when such an event occurs, it occasions no little flutter not only in gas circles, but among the general public, who appear to be getting quite hardened to ascending, and not descending, prices for all sorts of commodities. The daily Press jumps at a reduction in the price of gas as a matter worthy of prominent record, and as a useful whip with which to scourge those gas undertakings that show no signs of repentance for making charges which they cannot help, and which for more than one reason—the advantage of their own proprietors, the financial credit of the concerns, the satisfaction of customers, and the expansion of business—they would rather have the ability to cut down. When reductions are at present made, they are the proceeds of good fortune in some individual respect. Recently the South Suburban Gas Company announced a reduction of 3d., which set speculation rolling as to what had occurred to allow this to be done, and which was a thorn in the sides of a good many managers. They were constantly being assailed with the inquiry: "If the "South Suburban Company can do this, why cannot you?" As they did not know what was the enabling cause in the outer district of Southern London, and as they knew their own conditions, existing and prospective, would not permit of similar action, they could only shrug their shoulders, or else indulge in a little piece of guesswork that, more likely than not, was altogether the wrong explanation. The real reason transpires in the Directors' report. There has been a satisfactory settlement of an outstanding claim in respect of gas supplied for munition purposes, which justifies the Directors in reducing the price. Whether the Board will be able to maintain the reduction will depend on the cost of coal and labour. Uncertainties face. The 6d. reduction that the Directors of the Commercial Gas Company have just made is based upon an estimate which (as we understand from the speech of the Chairman, Mr. W. G. Bradshaw, at the meeting of the proprietors on Thursday last) includes probable additional costs. The Company have been particularly fortunate with their fleet of coal-carrying boats. They have not lost one during the war. Since the armistice, insurance of the vessels has fallen considerably; and they are fast producing economy by getting back to their normal number of voyages. In these ways, the cost of coal delivered on to the works has been brought down. Thus it is seen that it is only where special circumstances have happily intervened, that there has been an opportunity of making concession to consumers. This is quite evident to gas managements, who, with further threatened increase of costs, are not contemplating with composure the prospect of having to ask the gas consumers to pay still more.

Mr. Honoratus Lloyd, K.C., and Financial Revision.

THE feeling is spreading that the day is not far distant when gas companies will have to approach Parliament again, and ask for some further revision of their financial conditions. Commonsense suggests and simple justice demands this. We need not recapitulate the arguments advanced in the editorial article, published last week, under the heading of "Need for Regaining Sound Financial Conditions." Since the Statutory Undertakings (Temporary Increase of Charges) Act was passed, the financial situation of gas undertakings generally has got worse; and there are grounds too sternly present for admitting of any other belief than that costs for labour, railborne coal, and manufactured goods are going to still further ascend. Claims to additional pay continue to be made by labour on account of the increased cost of living; and in the case of the coal miners, the Government have just acknowledged that since the month of June last the cost of living has gone up to an extent justifying the payment of an additional 1s. per day. We will not argue here whether, under present wage conditions of the coal miners, they are entitled to any more than they are already getting. But the public know that they have not shown any enthusiastic disposition to relieve the country of its difficulties in the matter of the shortage of coal supplies.

However, the point is that, though there have been these many increases to labour—inside and outside the gas industry—on account of the higher cost of living, Parliament has not taken account of the fact that shareholders in gas undertakings (many of whom depend upon dividends from invested savings) desire to live, and that the cost to them of doing so has also risen in as great proportion as it has done for labour. When we trace back the causes that have brought these shareholders to grief in respect of dividends, it is found that the major part of them is due to payments to labour engaged in the production of the materials and goods required to carry on the business of the concerns in which are their investments. It must not be overlooked that most gas stock and share holders regard the position purely from the business point of view, and not from that of a statutory undertaking with definite limitations; and many speeches made at recent meetings (typical of which are those heard at the meetings of the South Metropolitan and Tottenham Companies) show that unrest as to their prevailing position and future prospects is penetrating among them. And who can wonder! The longer existing gas capital continues under its present ill-treatment, the worse it will be for the industry.

Chairman after chairman at meetings of gas proprietors is protesting against the present position, the absurdity of which was shown in a speech by Mr. Honoratus Lloyd, K.C., at the South Metropolitan Gas Company's meeting last Wednesday, in seconding the resolution declaring a dividend of 3 p.c. per annum. The securing of a fair remuneration for the capital invested in the industry is, as the Chairman of the Company (Mr. Charles Carpenter, D.Sc.) puts it, a difficult problem to face; but it has to be faced. Mr. Honoratus Lloyd cannot think that the time will be long coming when some alteration will take place in the basis upon which gas undertakings are carried on financially. He is hopeful that the new House of Commons will be more amenable to reason than were many of the members of the late one. The complexion of the House has been largely changed; but that of the Government and of the Board of Trade is much the same. However, Sir Albert Stanley is approachable, and is open to reason. With the new blood in the House of Commons, and with the intensified case that gas companies can put before Parliament, an attempt should be made to obtain a review and revision of a position which is, the longer it continues, increasingly injuring the industry. Whether or not any success would be achieved, can only be proved by an attempt being made. The Government themselves have admitted in their Five per Cent. War Bond advertisements that 3 p.c. is not a return with which investors should be satisfied in these times [see "JOURNAL" for Dec. 24, p. 652]. Gas investors are not.

An Omission from the King's Speech.

Every electrician in the country no doubt looked into the King's Speech to the two Houses of Parliament to see what His Majesty had to say regarding the reform of the electricity supply industry. He did not say anything about it; but perhaps the proposed legislation affecting it is tucked away under the words: "A large number of measures affecting the social and economic well-being of the nation await your consideration; and it is of the utmost importance that their provisions should be examined, and, if possible, agreed upon and carried into effect with all expedition." With this object in view, the Government are placing before the House of Commons certain proposals for the simplification of its procedure, which, it is hoped, will enable delays to be avoided, and give members an increasing opportunity of taking an effective part in the work of legislation. The speech contained a reference to the Bill to establish a Ministry of Ways and Communications, with a view to increasing and developing the industrial and agricultural resources of the country by improved means of transport. Perhaps it is in this connection that electricity comes in. Anyway it will be regarded by the electrical industry as a grave omission that His Majesty did not specifically name its commodity. Among the great social reforms that were duly mentioned was that of better and healthier housing.

National Benzol Association.

The National Benzol Association has been formed, and its objects, constitution, and regulations have been approved, with a couple of excisions and alterations to other rules, which did not meet with general approbation. The Association have not now power to promote any limited Company; and liberty is given to members in regard to prices by the elimination of the rule which contemplated binding them to the scale of prices issued by the Association. The National Gas Council have been endowed with the right to nominate representatives on the Executive Committee proportionately to their relative make of crude and refined benzol,

The other changes involve no particular principle, as will be seen from the more detailed information given elsewhere. But the outstanding effect of the changes is that those gas undertakings that saw in the rules certain obstacles to becoming members of the Association will find them removed; and their applications for membership will now be welcomed by Mr. P. G. Somerville, the Acting Secretary, at No. 84, Horseferry Road, S.W.

A Specification for Motor Benzol.

It will also be seen that the Association have lost no time in issuing a specification of quality for benzol for motor use. This is something that not only producers but users of benzol have been desiring; for, owing to undesirable excesses of sulphur, the presence of acids, &c., the good running experience with benzol has not been free from disadvantages. Other specifications for a standard benzol for motor use have from time to time been proposed; but this one bears the impress of the Association, and so should be the one to be worked up to, until (if ever) the Association sees fit to amend it.

A Motor Fuel Users' Association Proposed.

It is interesting to observe, while we are told the home production of benzol will not be sufficient to go round (which is an undeniable fact), how the oil people on the one hand are eager to obtain control of it, and, on the other hand, how keen the motor users are that the oil people shall do nothing of the kind. Yet they cannot suggest any immediate solution of the problem of independent distribution, unless gas undertakings will deal direct with the local retailers. However, "Motor" affirms in its last issue that the oil group are obtaining an increasingly strong grip on benzol, which will ultimately react to the disadvantage of both producers and users. Our contemporary therefore suggests that, if benzol producers will not organize distribution on lines which will fit in with the convenience of the bulk of users, the latter should organize a Motor Fuel Association of their own, which would look after the users' interests in connection with every form of home-produced fuel, including gas. Such an Association would be constantly watching, and always encouraging, the exploitation of alternative fuels. Benzol producers would certainly have no objection to a body being formed with whom they could confer and take action. While there are complaints as to what the producers have not yet done, there is no ordered presentment of the views of the users. If there is ground for blame, it must not be put all on one side. The producers of benzol have not had time to change completely from war to peace work. They have just escaped from the demands and directions of the Government; and the National Benzol Association has only within the past few days got on to its feet. The anxiety of users to obtain must not lead them to censure unfairly.

Gas Coal Stocks.

According to the "Iron and Coal Trades Review" the position of gas coal reserves, as disclosed by the latest list from the Coal Controller's Department, is that there are ninety works with less than one week's supply in sight, of which thirty are with less than three days' supply, and ninety-six with less than two weeks' supply. Since this list was compiled, in view of the recent uninterrupted output, it is safe (our contemporary thinks) to assume that a considerable improvement has taken place; and in another fortnight or so there should be nothing to worry about—especially having in view the lengthening daylight period.

The outcome of a feeling that, though there are in existence a large number of special societies representing different branches of chemistry, they stand in need of co-ordination and unification, as well as of development on the social side, has been the recent establishment of a Federal Council for Pure and Applied Chemistry, with the objects of advancing, safeguarding, and voicing the interests of chemical science. The promoters agreed that the ultimate aim should be the federation of all the bodies concerned with the development and applications of chemical science; the constituent bodies representative of special interests retaining their individuality, and each continuing to be the organ of its particular branch of activity, but all uniting to consider matters of general concern, to support publications of the federation, and to maintain a house where meetings could be held and accommodation provided for an official staff and a complete library. It is believed that a federation of the character outlined, if fully representative and presenting a united front, could be of great service, not only to chemical science, but also to the nation, to whose welfare and defence the chemist is indispensable.

PERSONAL.

Sir ARTHUR DUCKHAM, K.C.B., of the Ministry of Munitions, has been elected a member of the Institution of Civil Engineers. Sir Arthur has also been appointed an additional member of the proposed Air Council, which will have for its object the control of aviation.

Mr. R. E. GIBSON, the Engineer of the Liverpool Gas Company, has been transferred from the class of associate member to that of member of the Institution of Civil Engineers.

The Directors of the Bournemouth Gas and Water Company, in announcing that the General Manager, Lieut.-Colonel H. W. WOODALL, C.I.E., has returned to England after serving with distinction over a period of more than four years, express the hope that it may be possible for him shortly to resume his duties with the Company.

Sir WILLIAM J. JONES, K.B.E., the Managing Director of the Woodall-Duckham Vertical Retort and Oven Construction Company, Limited, and its allied concerns, is this week relinquishing his post at the Ministry of Munitions. Sir William has for the past two-and-a-half years held control over the Refractory Materials Section, and for the last year-and-a-half has acted also as Deputy Controller of the Iron and Steel Production Department, of which the Refractory Materials Section formed a branch. While he will now be free to devote more time to his business interests, his services will still be available to the department in an advisory capacity, and also in connection with the Research Committees for Refractories which have been instituted largely through his energies.

The Directors of the Bath Gas Company have appointed Mr. W. BLUNDELL (the Secretary of the Stretford Gas Company) as Secretary, to fill the vacancy caused by the resignation of Mr. H. SHEPHERD. In their report, the Directors announce with very great regret Mr. Shepherd's resignation, after 43 years' service with the Company, and they add that, in consideration of his long and valuable services, they have unanimously agreed to allow him a retiring pension. They also mention that Mr. ALBERT BROWNING has retired from the chair since the last meeting of proprietors, but retains his seat on the Board. Sir PERCY K. STOTHERT has succeeded him in the chair; and Mr. STEPHEN FOX-ANDREWS has been appointed Deputy-Chairman. Reference is made to the election, already recorded in the "JOURNAL," of Mr. C. STAFFORD ELLERY to a seat on the Board.

Reference is made in the report of the Directors of the Uxbridge Gas Company to the death of Mr. JAMES M. NORMAN, who had served as a Director since 1889, and to the election in his place of Mr. STANLEY H. JONES, M.Inst.C.E.

Due to the fact of Mr. J. WEST having obtained an appointment at Bargoed, Mr. D. V. HOLLINGWORTH, F.I.C., F.C.S., has become Manager of both the "Still" and "Carvé" works of the Birchenwood Colliery Company, Ltd. The plant now in his charge comprises 72 Carl-Still ovens of the regenerative type, 60 Carvé non-regenerative ovens, and 24 Carvé regenerative ovens, with benzol rectification plant, tar plant, concentrated ammonia liquor and sulphate plant, crude carbolic and crystal carbolic plant, and pure naphthalene plant. The whole plant carbonizes some 7000 tons of coal per week, which is practically the whole output of the Birchenwood pits.

In submitting the accounts for the past year, the Directors of the Reading Gas Company mention, with great regret, the death of Mr. J. OKEY TAYLOR, J.P., who had been Chairman of the Company since its incorporation in 1862. His death, at the advanced age of 92, severed a link with the past history of the Company and the gas industry in Reading. The Company's progress, they say, is the best evidence of his wise leadership; and his former colleagues desire to place on record their deep sense of the loss the Company have sustained. Mr. G. W. WEBB, F.R.I.B.A., J.P., has been elected Chairman, and Mr. T. E. HEWETT has been appointed Deputy-Chairman.

Mr. HERBERT BINGHAM has been appointed Manager of the Burgess Hill Gas Company, in succession to Mr. Whitcher, who has gone to Haywards Heath. Mr. Bingham has been engaged for many years with the first-named Company; and Mr. Whitcher is undertaking to give expert technical advice to his old Board of Directors.

M. P. ALAVOINE, a Director of the Beauvais Gas Company and of the "Gaz et Eaux" Compagnie, has been made an officer of the Legion of Honour. M. Alavoine is a Past President of the Société Technique du Gaz.

OBITUARY.

Mrs. ROBERT DEMPSTER, wife of Mr. Robert Dempster, of Vale Royal Abbey, Hartford, Cheshire, passed away, after a short illness, on Monday of last week, the 10th inst., aged 62. The previous week she visited the works at Manchester; the following day a cold developed; and on the Friday the doctor declared the case serious. Pneumonia supervened; and, in spite of all medical skill, death took place on Monday forenoon. The burial was in the Whitegate Churchyard. Mrs. Robert Dempster, in years gone by, was well known to a large circle of friends in the gas industry; and, up to the time of her death, she was actively engaged in

good work in the district round about Vale Royal. She largely supported, and took a great interest in, the local hospitals and in the comfort and entertainment of the soldier patients. The sympathy and respect shown by the neighbours and villagers at the funeral fully proves that they recognize in the death of Mrs. Dempster having lost a personal friend.

The death from pneumonia, on the 3rd inst., at Mersina, is reported of Major D. F. COLSON, D.S.O., R.E., who was serving with the Egyptian Expeditionary Force. At the outbreak of war he was a Captain in the Dorset R.E. (T.), and sailed to Gallipoli, in August, 1915, where he remained until the evacuation. In June, 1916, he went to France with the 60th London Division, in command of a field company, at the same time receiving his majority. In November of the same year, the division was removed to Salonika; and, after remaining there for one year, it was moved to Egypt. Major Colson served through the whole of the Palestine Campaign, under General Sir Edmund Allenby, and, at the time of his death, was on his way to Asia Minor to carry out engineering works in connection with the railway. In January, 1917, he was mentioned in Sir Douglas Haig's despatches. In January, 1918, he was awarded the D.S.O., and was again mentioned in despatches by Sir Edmund Allenby. He also served in the South African War; receiving the Queen's Medal with two clasps. He was the eldest son of the late Mr. Alfred Colson, of Leicester, and before the war was Engineer and Manager to the Weymouth Consumers' Gas Company. In 1904, he left Leicester to take up his position at Weymouth, where he remained for ten years. After, however, having been on military duty for nearly four months, he found it, in November, 1914, impossible any longer to carry on his work with the Gas Company.

American Gas Industry and the War.

From figures given in the "Gas Record," of Chicago, by Mr. Robert E. Livingston, it appears that the twelve toluol plants of New York City furnished 70 p.ct. of all the toluol used in United States Government works for conversion into "T.N.T.;" while the New York Consolidated Gas Company, in addition to providing their quota of toluol, carbonized nearly all the material employed in the manufacture of 5,000,000 gas masks. From the seven plants of the Consolidated and allied Companies, 1,600,000 gallons of toluol were obtained in nine months; and from the five plants of the Brooklyn Union Company, 390,000 gallons. Reckoning this output at 2,000,000 gallons, it meant 28,000,000 lbs. of "T.N.T.;" and as from a gallon of toluol enough "T.N.T." can be obtained to load from seven to ten 3-in. or 75 mm. shells, this supply would fill from 14,000,000 to 20,000,000 light artillery shells. On one sector of the American front in the last stages of the war, there were fired 2,000,000 of these 3-in. shells in twenty-four hours. Towards the end of the war, the requirements of the American army were estimated at 20,000,000 gallons of toluol a year, and those of the navy 600,000 gallons. Throughout the States, there were twenty-eight toluol plants stationed at the works of gas companies. For carbonizing cocoanut shells, &c., to provide charcoal for gas masks, the Consolidated Company put down special plant; and they also manufactured soda lime for the Government.

American Gas Association Committees.

The Managing Committee of the Commercial Section of the American Gas Association have approved the appointment of the principal committees, and mapped-out the definite line of work which they will undertake. Those organized are the Managing Committee, who will have jurisdiction over all the activities and committees of the section; the Advertising Committee, who will act as a clearing-house for gas company advertising; the Heating Committee; the Industrial Fuel Committee; the Relation with Architects and Builders Committee, whose function will be the establishing of a close and harmonious relationship between the gas company interests and the architects, builders, and contractors; the Sales Development Committee, whose work is really the backbone of the Commercial Section's activity; and the Illumination Committee. Similarly, the Managing Committee of the Technical Section have approved the appointment of various committees to carry on their work. These are the Committee on Refractory Materials; the Committee on Electrolysis; the Chemical Committee, who will co-operate with other associations on chemical matters of interest to the gas business; the Committee on Cast-Iron Pipe Standards; the Committee on International Pipe-Thread Standards; the Committee on Distribution Standards; the Carbonization Committee; the Standard Tests Committee, who will be dealing with the tests for determining the efficiency of a gas manufacturing plant; the Nomenclature Committee; the Committee on Calorific Standards; and several General Committees.

At a meeting of the Scottish Junior Gas Association (Western District), in the Royal Technical College, Glasgow, next Saturday evening, Mr. W. J. Lennox, of Falkirk, will submit a paper entitled "Repairs and Maintenance in Gas-Works."

There will be a visit next Saturday of members of the Manchester and District Junior Gas Association to the works at Ashton-under-Lyne of the National Gas-Engine Company. In the evening, Mr. C. J. Woodhead, of Huddersfield, will read a paper on the "Handling of Coke."

NATIONAL GAS COUNCIL OF GREAT BRITAIN AND IRELAND.

Further Office-Bearers Elected.

IN addition to the office-bearers notified last week [p. 260] as having been elected at district meetings in connection with the reconstituted National Gas Council, the following names have since been received.

It was reported last week that Mr. Norman Cox had been appointed Vice-Chairman of the Northern District Employers' Committee. This was a mistake, Mr. F. P. Tarratt having been appointed to that position.

EASTERN DISTRICT.

DISTRICT EXECUTIVE BOARD.

Mr. E. H. PARKER, Chairman.
Mr. THOS. GLOVER, Vice-Chairman.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

A Representative of the Lincoln Corporation Gas Department
Mr. W. W. TOWNSEND.
Mr. R. G. SHADBOLT.
Mr. THOS. GLOVER.

The appointment of a Management Committee was deferred until such time as a larger number of undertakings join the Board. Management was temporarily vested in the following:

The Chairman.
The Vice-Chairman.
The four Representatives on the Central Executive Board.
The Secretary.

SEPARATE COMMITTEE OF EMPLOYERS.

Mr. F. PRENTICE, Chairman.
Mr. A. MITCHELL, Vice-Chairman.

REPRESENTATIVES ON CENTRAL COMMITTEE.

Mr. W. W. TOWNSEND.
Mr. R. G. SHADBOLT.
Mr. F. PRENTICE.
Mr. J. H. TROUGHTON.

MANAGEMENT COMMITTEE.

The appointment of this Committee was deferred until such time as a larger number of undertakings join the Board. Meanwhile management is vested in:

The Chairman.
The Vice-Chairman.
The four Representatives on the Central Committee of Gas Employers.
The Secretary.

MANCHESTER DISTRICT.

DISTRICT EXECUTIVE BOARD.

Alderman WILLIAM KAY, J.P., Chairman.
Alderman PENROSE GREEN, J.P., Vice-Chairman.
Mr. J. H. SILLITOE, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Alderman WM. KAY, J.P., Manchester.
Mr. R. E. GIBSON, Liverpool.
Mr. CHAS. WOOD, Bradford.
Mr. HANBURY THOMAS, Sheffield.

MANAGEMENT COMMITTEE.

Mr. R. E GIBSON, Liverpool.
Mr. S. TAGG, Preston.
Mr. H. KENDRICK, Stretford.
Mr. Alderman PHILLIPS, Salford.
Mr. W. J. SMITH, Bolton.
Mr. S. MEUNIER, Stockport.
Mr. HANBURY THOMAS, Sheffield.
Mr. H. TOWNSEND, Wakefield.
Mr. E. H. HUDSON, Normanton.
Mr. C. S. SHAPLEY, Leeds.
Mr. C. WOOD, Bradford.
Mr. W. B. M'LUSKY, Halifax.

SEPARATE COMMITTEE OF EMPLOYERS.

Alderman F. S. PHILLIPS, J.P., Chairman.
Mr. CHAS. WOOD, Vice-Chairman.
Mr. J. H. SILLITOE, Secretary.

REPRESENTATIVES ON CENTRAL EMPLOYERS' COMMITTEE.

Mr. R. E. GIBSON, Liverpool.
Mr. HANBURY THOMAS, Sheffield.
Alderman W. KAY, Manchester.
Mr. CHAS. WOOD, Bradford.

MANAGEMENT COMMITTEE.

Mr. R. E. GIBSON, Liverpool.
Mr. S. TAGG, Preston.
Mr. H. KENDRICK, Stretford.
Alderman KAY, Manchester.
Mr. W. J. SMITH, Bolton.
Mr. S. MEUNIER, Stockport.
Mr. HANBURY THOMAS, Sheffield.
Mr. H. TOWNSEND, Wakefield.
Mr. E. H. HUDSON, Normanton.
Mr. CHAS. WOOD, Bradford.
Mr. W. B. M'LUSKY, Halifax.
Mr. A. E. MOTTRAM, Ossett.

SOUTH-WESTERN DISTRICT.

DISTRICT EXECUTIVE BOARD.

Mr. G. HARDY HARRIS, Chairman.
Mr. S. E. HALLIWELL, Vice-Chairman.
Mr. J. ARMSTRONG, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Mr. W. N. WESTLAKE.
Mr. J. H. ELLIS.
Mr. S. E. HALLIWELL.
Mr. S. J. INGRAM.

MANAGEMENT COMMITTEE.

Mr. W. N. WESTLAKE.
Mr. S. J. INGRAM.
Mr. P. S. HOYTE.
Mr. H. E. RILEY.
Mr. H. H. HOARE.
Mr. W. P. TERVET.
Mr. P. THOMAS.
Mr. F. O. O. CHUBB.
Mr. T. H. WOODCOCK.
Mr. E. J. BURT.
Mr. J. WESLEY WHIMSTER.
Mr. R. BEYNON.

SEPARATE COMMITTEE OF EMPLOYERS.

Sir PERCY K. STOTHERT, K.B.E., Chairman.
Mr. R. ROBERTSON, Vice-Chairman.
Mr. J. TAYLOR, Weston-super-Mare, Secretary.

REPRESENTATIVES ON THE CENTRAL COMMITTEE.

Sir PERCY K. STOTHERT, K.B.E.
Mr. W. N. WESTLAKE.
Mr. R. ROBERTSON.
Mr. P. S. HOYTE.

MANAGEMENT COMMITTEE.

Mr. W. N. WESTLAKE.
Mr. P. S. HOYTE.
Mr. H. H. HOARE.
Mr. J. WESLEY WHIMSTER.
Mr. F. O. O. CHUBB.
Mr. S. J. INGRAM.
Mr. W. E. DEAN.
Mr. J. E. NORMAN.
Mr. P. AMES.
Mr. C. G. DAWSON.
Mr. R. BEYNON.
Mr. J. B. CATTLE.

SOUTHERN DISTRICT.

DISTRICT EXECUTIVE BOARD.

Mr. WILLIAM CASH, Bournemouth, Chairman.
Mr. A. F. PHILLIPS, St. Albans, Vice-Chairman.
Mr. H. C. HEAD, Secretary.

REPRESENTATIVES TO ACT ON THE CENTRAL EXECUTIVE BOARD.

Mr. WM. CASH, Bournemouth.
Mr. A. F. PHILLIPS, St. Albans.
Mr. C. F. BOTLEY, Hastings.
Mr. W. G. BRADSHAW, Commercial Gas Company.

COMMITTEE OF MANAGEMENT.

Mr. WILLIAM CASH, Bournemouth.
Mr. D. T. LIVESEY, East Grinstead.
Mr. W. THOMSON, Ramsgate.
Mr. A. F. PHILLIPS, St. Albans.
Mr. F. LIVESEY, Maidstone.
Mr. H. C. HEAD, Winchester.
Mr. W. H. BENNETT, Redhill.
Mr. A. VALON, Westgate.
Mr. CHARLES CARPENTER, D.Sc., South Metropolitan Gas Company.
Mr. C. F. BOTLEY, Hastings.
Mr. H. A. STIBBS, Portsmouth.
Mr. J. R. H. JACOBS, Southampton.
Mr. W. G. BRADSHAW, Commercial Gas Company.

The question of the division of the district into a Metropolitan and a Southern district was discussed; and it was arranged that this should be a matter for the earliest consideration of the reconstituted Council.

SEPARATE COMMITTEE OF EMPLOYERS.

Mr. WM. CASH, Bournemouth, Chairman.
Mr. A. F. PHILLIPS, St. Albans, Vice-Chairman.
HON. SECRETARY, *pro tem.*, Mr. H. C. HEAD, Winchester.

REPRESENTATIVES TO ACT ON THE CENTRAL COMMITTEE.

Mr. WM. CASH, Bournemouth.
Mr. A. F. PHILLIPS, St. Albans.
Mr. W. G. BRADSHAW, Commercial Gas Company.

COMMITTEE OF MANAGEMENT.

Mr. D. MILNE WATSON, Gas Light and Coke Company.
Mr. WM. CASH, Bournemouth.
Mr. D. T. LIVESEY, East Grinstead.
Mr. A. F. PHILLIPS, St. Albans.
Mr. F. LIVESEY, Maidstone.
Mr. H. C. HEAD, Winchester.
Mr. W. H. BENNETT, Redhill.
Mr. A. VALON, Westgate.
Mr. J. R. H. JACOBS, Southampton.
Mr. W. G. BRADSHAW, Commercial Gas Company.
Mr. W. E. PRICE, Hampton Wick.
Mr. J. URQUHART, Dorking.
Mr. F. W. CROSS, Lea Bridge.
Mr. C. V. BENNETT, Rochester.

SCOTLAND.

DISTRICT EXECUTIVE BOARD.

Mr. A. S. LEGAT, Chairman.
Bailie J. C. DRUMMOND, Vice-Chairman.
Mr. J. W. NAPIER, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Mr. A. S. LEGAT.
Bailie J. C. DRUMMOND.
Mr. J. W. NAPIER.
Mr. L. HISLOP.

MANAGEMENT COMMITTEE OF DISTRICT EXECUTIVE BOARD.

Mr. A. S. LEGAT, Coatbridge.
Mr. ALEX. YUILL, Dundee.
Mr. L. HISLOP, Uddingston.
Bailie R. G. SLORACH, Hamilton.
Bailie J. C. DRUMMOND, Glasgow.
Dean of Guild MUIRHEAD, Falkirk.
Captain MUIRHEAD, Stirling.
Mr. J. LANG, Alexandria.
Mr. J. W. NAPIER, Alloa.
Mr. JAS. DICKSON, Johnstone.
Mr. ALEX. WILSON, Glasgow.
Judge ELLIOT, Edinburgh.

SEPARATE COMMITTEE OF EMPLOYERS.

Mr. A. S. LEGAT, Chairman.
Bailie R. G. SLORACH, Vice-Chairman.
Mr. P. B. WATSON, Wishaw, Secretary.

REPRESENTATIVES TO CENTRAL EMPLOYERS' COMMITTEE.

Mr. A. S. LEGAT.
Bailie R. G. SLORACH.
Mr. P. B. WATSON.
Mr. J. LANG.

MANAGEMENT COMMITTEE.

Mr. A. S. LEGAT.
Mr. ALEX. YUILL.
Bailie R. G. SLORACH.
Mr. J. LANG, Alexandria.
Mr. J. W. NAPIER.
Judge ELLIOT,
Mr. J. A. TAIT, Bridge of Allan.
Dean of Guild MUIRHEAD, of Falkirk.
Mr. R. SIMPSON, Cambuslang.
Capt. J. C. MUIRHEAD, Stirling.
Mr. P. B. WATSON, Wishaw.
Provost BUCHANAN, Dumbarton.

WALES.

DISTRICT EXECUTIVE BOARD.

Mr. G. CLARRY, Chairman.
Mr. R. G. CLARRY, Vice-Chairman.
Mr. OCTAVIUS THOMAS, Secretary.

REPRESENTATIVES ON CENTRAL EXECUTIVE BOARD.

Mr. G. CLARRY.
Mr. R. G. CLARRY.
Mr. J. MOGFORD.
Mr. OCTAVIUS THOMAS.

MANAGEMENT COMMITTEE.

Mr. OCTAVIUS THOMAS.
Mr. WM. CLARK JACKSON.
Mr. T. E. FRANKLIN.
Mr. E. REES.
Mr. A. J. BOND
Mr. J. MOGFORD.
Mr. G. CLARRY.
Mr. T. C. KIRK.
Mr. J. H. CANNING.
Mr. R. G. CLARRY.
Mr. H. BARKER.
Mr. E. H. SWAIN.

SEPARATE COMMITTEE OF EMPLOYERS.

Alderman HOPKIN MORGAN, Chairman, *pro tem.*
Mr. J. H. CANNING, Vice-Chairman, *pro tem.*

REPRESENTATIVES ON CENTRAL EMPLOYERS' COMMITTEE.

Alderman HOPKIN MORGAN.
Mr. J. H. CANNING.
Mr. OCTAVIUS THOMAS.

MANAGEMENT COMMITTEE.

Mr. G. DAVIES, Briton Ferry.
Alderman H. MORGAN, Neath.
Mr. E. H. SWAIN, Llynvi Valley.
Mr. J. H. CANNING, Newport.
Mr. W. B. MIMMACK, Pembroke Docks.
Mr. T. C. KIRK, Brecon.
Mr. LEONARD MURRAY, Brynmawr.

The election of the remaining representatives to be postponed for the present.

Portable Cubic Foot Standard for Gas.

The Director of the United States Bureau of Standards has communicated to the "Journal of the Franklin Institute" (of Philadelphia) an abstract of a paper by Mr. M. H. Stillman, describing a new type of volume standard for measuring gas, "which has been found to possess decided advantages as a cubic-foot standard over the apparatus of this class largely in use at the present time." While especially well adapted to the class of work in which an inspector is required to make tests of gas-meter testing equipment distributed over a fairly considerable territory, it has also been successfully used for other purposes in which the delivery of a comparatively small volume of gas with a high degree of accuracy is required. The device is essentially a miniature meter prover, radically modified so as to secure accuracy and rapidity in operation and compactness in construction. An auxiliary meter-prover scale, the use of which contributes to the accurate and convenient calibration of meter provers, is also described. Further particulars are not for the moment available.

Oxidation of Coal.

Dr. R. V. Wheeler, in a paper which he prepared some time ago, explained some experimental results by the hypothesis that "the first step in the oxidation of coal is the formation of an additional compound, or complex, of oxygen with one or more of the substances present in coal." In an article contributed to the "Chemical News," Mr. J. R. Partington, D.Sc., suggests that this hypothesis does not account for the observed results, and that it should be replaced by another. He says that, if a mixture of gases is brought in contact with freshly-hewn coal deprived of its occluded gas, absorption takes place on the surface of the coal. The absorbed layer of gas, being under high pressure, will react more or less rapidly with the coal, and oxides of carbon will be produced. If the process whereby atmospheric gases are taken up by coal is one of absorption, the pressure of the air brought in contact with the coal will fall rapidly for a short period, and will then gradually fall off until absorption equilibrium is reached. The absorbed layer will then begin to react—possibly slowly—with the production of oxides of carbon. There is every reason to believe that the primary product of the interaction of carbon with oxygen is carbon monoxide alone. There is also reason to believe that when carbon dioxide is produced, it is always as a result of an interaction with water—the latter acting as a catalyst.

Gas-Workers' Demands.—It was stated in "The Times" last Wednesday that "at a meeting of the representatives of the gas undertakings of the country, held yesterday at the Caxton Hall, it was unanimously decided, after consideration of the employees' demands for largely increased wages, to inform the workmen's unions that the gas companies were prepared to submit all wage questions in dispute to arbitration. With regard to the demand for a 44-hour working week, the meeting resolved that the question ought to be treated from a national point of view, and not as one affecting any particular industry."

ELECTRICITY SUPPLY MEMORANDA.

REFORMATION continues the primary subject of controversy in the electricity supply industry. Even the tubular catastrophe to London the other week, and the fiasco over the threat to put London in darkness where gas does not prevail, have not disturbed the ardent spirits who discuss something that has not yet been definitely planned, and who make forecasts as to the lines of the electrical legislation that the Government are going to produce to help forward an industry that the Government believes has shown such incapacity that their intervention has become necessary. There has been a discussion on the past, present, and future of electricity supply at a meeting of the Manchester Association of Engineers. It was opened by Mr. S. L. Pearce, the enterprising Electrical Engineer of the Manchester Corporation, who has shown a disposition all along for this matter of reformation to be attacked in a methodical way, and not by revolutionary methods which may put on the industry conditions that may handicap it for years to come. The reported discussion covers more ground than we can open-up here. A few points, however, invite attention. According to Mr. Pearce, electricity is at present furnished by three classes of undertakings—something like 330 local authorities, 308 companies, and about 35 power companies. The total capital invested approximates 120 millions, the output nearly 3000 million units, something like 2¼ million K.W. of plant is installed, and no less than 700,000 K.W. of plant is at the present time under construction. The wonder is how all this is going to fall in comfortably with the new, but as yet unknown, plans. The best of it all has to be brought in somehow. But for what purpose this consolidation of generation? Is it for a national or only for a partial benefit? Mr. Pearce does not strike us as being sanguine that the proposed big schemes are going to materially profit the areas where there are already big stations; and these areas are largely the industrial ones which the good folk Westminster way are proposing to assist in their particular manner to (so they think) secure cheaper power. Will this be the result? Mr. Pearce "does not look forward to the supply of electricity being cheapened to any great extent to those areas now served by modern stations and modern plant; but, by the scheme outlined, the conditions prevailing there would be reproduced all over the country." This is a very guarded statement. The areas now being served by modern stations and plant are the richest for electrical business in the country; and, in view of the costs of transmission, it is impossible to see how, without detriment to these areas, other less electrically lucrative ones can be supplied on "the conditions prevailing there." The "conditions prevailing there" we take it include price; if Mr. Pearce means something else, then his point is not clear. Therefore, it may be taken that the at present richest power areas are not going to be better off; the others are. The large industrial areas had better look well after their own interests while the scheme is maturing, and see that they do not suffer injury for the advantage of other parts of the country.

What will it Profit the Industrial Areas?

Transmission Points.

The costs of transmission naturally increase with distance; and it has lately been seen that they are by no means light [*ante*, p. 67]. Transmission will naturally be from industrially well-packed areas to leaner areas; and costs and losses will therefore be much heavier in the latter than in the former. There has been much talk lately as to wayleaves and overhead transmission, with the view to reducing capital costs. On the first blush, one would be inclined to regard overhead transmission as being the cheaper, if not publicly the safer, system. But Mr. Pearce's investigations have led him to the conclusion that the maintenance of overhead transmission cables will, compared with underground work, reduce the cost advantage of the system. Closely allied is the old ideal of generating electricity at the pit's mouth. Here, again, at the majority of colliery sites, water is not present in the volumes required for modern steam-turbine plants. An insufficiency of water would be fatal to such a scheme. Then further we have Mr. Pearce pointing out that, in transmitting energy from the Midlands to London, the transmission losses would not be low; and the capital outlay would be enormously high by reason of the mileage. Therefore, he cannot see any possible future for such a scheme. Little by little we are getting into focus the limitations of the wonderful visions that have been formed, and entranced by which the Government are proceeding to lay their plans. Legislation is being proposed on the crudest of foundations.

The Private Plant v. National Supply.

There are two or three things that the electricians who discuss these schemes will not publicly acknowledge, although they may privately realize them. Naturally, they do not like manufacturers having their own private generating plants; but manufacturers have their own interests to consider. Recent labour events have shown that the manufacturer has greater security in having his own generating plant than in taking a supply from a public distribution system; and this additional security is worth something to him. If he has a properly designed plant, too, his security against failure of supply other than through labour is also greater. If he uses a properly fitted steam-boiler, he has also the local gas-works upon which he can rely for coke; if he uses a gas-engine, his fuel supply is always available. Further, in a large factory where steam and hot water are required, a steam plant is necessary, and then it becomes an economical thing, under many conditions, to generate (if electric running be preferred) the required energy. This is a matter over which there cannot be any generalization on the part of electricians; every case must be dealt with on its own merits. In the discussion referred to in the preceding paragraphs, Dr. Cramp expressed the view that, given a manufactory with a good load factor, he did not believe an outside authority could furnish electrical energy at a price that would tempt the owner. Taking a small plant—say, 400 H.P.—with a 75 p. ct. load factor, it would be found possible even under existing war conditions, and with coal at 25s. per ton, to generate electricity at a cost of 0·38d. per unit. Under the big national scheme, Dr. Cramp reckons that the capital costs per unit would approximate this figure; and the generating costs would have to be added. In the circumstances, he does not see how a super-station can attract a customer of the kind. Yet it is such customers who are being relied upon for the improvement of the load factor and the diversity of demand necessary for the reduction of the working costs of power stations. The fact is the costs of distribution are very high; and so Dr. Cramp cannot see that the extension of the area and the increased size of the stations will help the generating engineer to at all reduce the cost. It will be remembered that Mr. W. C. Mountain also not long since quoted some low costs by private generating plants, to which we gave publicity on Dec. 17 last [p. 613]. It may be quite true that no private plant can hope to vie with the figures that are quoted by certain turbine builders, of between 8 and 9 lbs. of steam per KW. hour in modern turbines operating upon high pressure, high superheats, and high vacuum; but this is a point that does not exhaust the considerations of the factory owner.

A Hopeless Outlook for Station Engineers.

Already the prophets have been at work upon, and have been making forecasts as to, the intentions of the Government in regard to their Electric Power Bill. "Intelligent anticipation" is an easy matter; for the "anticipation" follows closely upon the lines of the report of the Board of Trade Electric Power Committee. So for the nonce we will leave prediction. "Electrical Industries" refers to it in a leading article; but it goes on to deal with a matter which is considered to be of more practical importance than the ownership and control of generating stations. It will be a long time ahead before electrical generation and local distribution can be so widely separated that the technical qualifications of the station engineer can be dispensed with, and nothing be required locally but men who can deal, both technically and commercially, with the energy that is supplied to them. This, however, is what plans are tending towards; and there will have to be a large conversion of the present station engineers if they cannot afford to go into retirement, where they can ruminate over things that have been, and the wonderful changes that have brought them to a period of inactivity, with over it all the solacing thought that it has been for the supposed benefit of the nation. Our contemporary, in foreseeing that the majority of managers of supply undertakings will be forced to confine their attention to the distribution and sale of electricity, says very few electrical engineers have the education or capacity for this phase of enterprise. So for them the look-out is a bad one. It will be a hard thing to convert from a producer to a keen salesman a man who has had nine-tenths of his mental vigour concentrated on making, and the remaining fraction on selling, electricity. Therefore, where this cannot be done, the only alternative will be to scrap the qualifications of these many men, and send them into retirement, appointing in their stead managers who will occupy themselves solely with salesmanship.

Hope and Facts.

There are electrical people who are counting too much on the difficulties that gas undertakings have experienced during the war having such permanent effect that their keenness as rivals with electricity will be greatly depreciated. They are counting too much on their chickens before they are hatched. The gas industry has not stood still during the war. It has had its revelations, as well as its difficulties. It sees before it ways and means of greatly discounting its increased costs by economy realizing methods; and so advancing by the safe road of a higher efficiency in manufacture and utilization. Moreover, the gas industry does not stand alone in being committed to work at a cost for materials and labour in excess of pre-war lines. The electricity industry will find costs higher from capital, through the generating expenditure, and onwards through distribution, up to and including the points of utilization. Electricity is not exempt; and the overhauling that the industry is going to have under the new conditions will be more expensive to it than if it had been done and completed before the war. Mr. George A. Hughes, the President of the Edison Electric Appliance Company, has been talking about electric-cooking prospects in America, which, he thinks, are excellent in view of the falling-off of the demand for electric energy for munition purposes (which has released a considerable amount of plant for producing current which could be sold at a preferential rate for cooking), and of the higher wages which servants are demanding, and which (if the servants

are dispensed with) will compensate for the extra cost of cooking by electricity. The same argument would apply with equal (even more) force to gas cooking. Servants, of course, are not kept for cooking only, and, whatever the form of fuel used, somebody has to prepare and attend to the food cooked. It cannot do these things itself. What gas and electricity can do is to lighten labour. Whether an employed cook or the mistress of the house is there, the expense for the gas or current and the work are the same, if each individual conscientiously performs her part. Moreover, on this side, people have been fast learning that electricity as an economical cooking agent has such limitations that they prefer one agent that can perform the all-round service. They have also learned that the heating power of electricity may be as low as 5 or 6 p.ct. of the original heating energy of the coal used in producing it, and only in exceptional cases or districts does it rise as high as 10 p.ct. Nor does the Coal Conservation Committee see the slightest chance of super-stations working at higher efficiency than 13 p.ct. Therefore, we are not in the least disturbed by Mr. Hughes's statement and opinion that the conditions among gas companies have been "much more seriously affected by the war than were those of the central station companies, and consequently will not offer the keen competition they formerly did in the matter of making extensions to their mains, or providing additional capacity." Whatever may happen in America, we shall see what will occur on this side. In saying this, we may rejoice over the intelligence which there is in this remark of the "Electrical Review"—"Electricity used to be looked upon in the early days as the bitter rival of gas; but the progress of time and science has shown that they are not only not rivals, but interdependent, and equally important to the community." Our electrical friends will no doubt have been interested in the statement published by us last week as to the direct assistance that the gas industry gave in defending them and the rest of the community by the supply of materials for explosives manufacture, without which we should to-day have been under German rule.

"GAS AND GAS MAKING." *

We are glad to see the inclusion of a book on the above subjects in the "Common Commodities and Industries" series which is now being issued by Sir Isaac Pitman and Sons, Ltd. The time is singularly opportune for the dissemination of authentic information as to the character and scope of the gas industry, and the services it renders both to the individual and to the country. The author is Mr. W. H. Y. Webber; and he may be congratulated on a useful contribution which, in not too technical language, gives to the student of the nation's chief industries a well-considered account of the methods and problems involved in gas manufacture, the subsequent domestic and industrial uses to which gas is and may be put and the very important part played by the industry in developing coal efficiency, thereby materially achieving the country's present need, conservation of coal.

The book consists of only 130 pages, but sufficiently covers the ground for the general reader, who, at the modest price of 2s. 6d., will have a good idea of the present position and the potentialities of the gas industry, as well as many useful hints for his own domestic employment of gas. The volume lacks a date—necessary where change and transition are characteristic features of the subject discussed. In the opening chapter, Mr. Webber briefly sketches the progress made by the industry as a public service undertaking from crude beginnings as a mere purveyor of illuminating gas until it has "arrived at the position of being the most economical user of the national coal capital, which it converts into the strongest known artificial combustible gas"—applicable to myriad purposes, industrial and domestic, with very important bye-products essential to the country.

The author suggests that the true coal economist should aim at the consignment to the gas-works of all coal intended to subserve domestic, and in great measure manufacturing, purposes, and that "buyers of raw coal for particular requirements should be licensed for definite periods, with liberty to apply again." Certainly the achievement of such a scheme would see a startling national saving of coal.

As the volume is not intended as a gas student's text-book, it is quite unnecessary to deal closely with the section on gas-making practice. It is sufficient to say that the author divides this into three periods; the first, referring to direct-fired retort-settings, being briefly disposed of. In the second, consideration is given to gas made from regenerative retort beds with high heats, or, alternatively, coal gas blended with carburetted water gas, and to the gradual introduction of stoking machinery, or the adoption of inclined retort-settings with a view to lessen labour. There is some discussion of the chemical composition and character of the types of gases thus made; but the analyses furnished are not very satisfying. We get, for instance, one of an early-day 17 c.p. gas when flat-flame burners only were used, followed by others of carburetted water gas used to enrich the coal gas when coal fell off in quality. An analysis of the blend of 16 c.p. gas is missing, and the author turns to discuss the carbon monoxide bogey, which we thought was, and might have been left, buried. As the reader is presented with carburetted water gas analyses showing up to 33 p.ct.—a figure approximating to the 40 p.ct. which must not be exceeded to keep within the Government's maximum of 17 p.ct. for the "blend"—he ought at once to have been presented with a further analysis proving that the average CO content for such blend of gas was well below this amount. A reference to an analysis appearing in a later chapter would have, at any rate, made matters clear.

Some illustrations of water-gas plants and of retort-settings are included, but not textually described. Those of the settings unfurnished with mouthpieces or ascension-pipe fittings may not be particularly clear to non-technical readers. Incidentally, it may be said that this possibility would perhaps have been obviated if the brief, but sufficient, Chapter VII., upon "Gas-Works Plant" had preceded the discussion of gas-making practice. The pages devoted to later methods of carbonization are naturally of present interest. Here is reference to the advantages of horizontal retorts charged by power stoking machinery; to the increased benefits derived from vertical retorts; and to the possibilities of retort ovens. Mr. Webber betrays some partiality for the mass treatment of coal, and had previously referred to the principle as "being revived in the latest gas-works practice"—a suggestion which the few isolated cases of retort-ovens in gas-works certainly do not justify.

Under "Modern Carbonizing Standards," the author writes of present-day gas of 500 B.Th.U., and shows the increase in thermal units per ton of coal, and consequent economy, obtainable by modern methods of manufacturing a blend of coal and water gas. This chapter also deals briefly with the residuals produced. The author refers to the calorific standard now usually imposed by Parliament, which he says has never taken account of the chemical composition of the gas. He, however, includes a "chemical audit" of the carbonizing process carried on in gas-works, where a "physical audit" of the thermal units of a ton of coal would probably have been more useful.

The remaining half of the book is devoted to the transmission and distribution of gas, and to its many uses for lighting, heating, cooking, and industrial purposes. These subjects are instructively, although briefly, dealt with, and to those seeking general information should prove of service, since the author's statements are well founded, and can stand criticism from competing interests. Some of his data, while proving the cases in hand, are unnecessarily on the low side.

In the general descriptions that are given of the methods and principles involved in transmitting, distributing, and measuring gas, Mr. Webber might have included some particulars as to the internal piping of houses, the size of which has so important an influence on the satisfactory performance of the apparatus employed. He simply proceeds to the uses of gas, without saying anything of the pipes lying between the meter and the consumers' fittings and appliances; and this is unfortunate, in view of the difficulties frequently experienced through inadequate supplies. The two or three chapters covering the general fuel application of gas should prove interesting. Mr. Webber deals with and adduces theory and data to show that, for fuel purposes, including that of incandescent burners, a 600 B.Th.U. ranks no better than the present day 500 B.Th.U. gas.

One cannot agree with the passing reference to public lighting, under the general uses to which gas is put, where it is stated that the smallness of the profit made from this source causes gas undertakings to "commonly view with equanimity" (save as an advertisement) its loss to an electric lighting department. Public lighting may not mean much profit; but the extra gas helps to lessen manufacturing and standing charges per 1000 c.ft. of gas sold

It is pleasing to note that, in the pages on Incandescent Gas Lighting, the author at once refutes the "popular idea that the use of gas for lighting is dying out in the competition of electric light;" and he shows that gas is not only cheaper, but has physical characteristics in its favour. Why, however, does he credit an inverted incandescent burner with a value of 12 c.p. per cubic foot when double this value is nearer the mark? The same tendency to underestimate is noticeable in the several chapters on cooking, water heating, and gas-fires. We are simply told, for instance, that the "efficiency of the best modern gas-fire in respect of the proportion of the heat of the gas realized as radiant heat is about 50 p.ct." Nothing is said of the 20 to 25 p.ct. convected heat, which is not without value in heating a room, or of the ventilating effect of the balance of heat which goes up the chimney. The radiant value attributed to a coal-fire is on the high side.

There is an interesting chapter on "Speculations as to the Future" of the gas industry, and its possibilities in solving coal conservation problems. The concluding chapter is certainly useful, in that it furnishes "Hints for Gas Consumers"—advice, indeed, for which we had been looking in the chapters devoted to lighting, cooking, and heating. These might have been slightly amplified to include some hints on incandescent gas-burner usage. The book should give the general reader a good idea of the work carried out by gas undertakings and of the varied fields for the use of gas by the public.

* "Gas and Gas Making." By W. H. Y. Webber. London: Sir Isaac Pitman and Sons, Ltd. [Price, 2s. 6d. net.]

Reconstruction Problems.—The latest of the pamphlets—it is No. 13 of the series—published, at the price of 2d. net by the Ministry of Reconstruction, is on the subject of "Rural Industries." Illustrations are given of industries that might be developed in many districts.

IMPROVEMENTS IN CARBONIZING APPARATUS.

By NORTON H. HUMPHRYS.

THE objects of the inventions here described (which are covered by Provisional Protection) are the prevention or diminution of the formation or accumulation of carbonaceous, viscid, or clotty deposits in the retort or the outlet therefrom; improved results both as to quantity and quality of the products; a combination of the advantages peculiar to the dry main and hydraulic main, respectively; and to facilitate the working of twin or coupled retorts.

Among the defects inherent to all systems of carbonization at present in use—which include horizontal, inclined, vertical, and chamber retorts, coke-ovens, and cupolas—are liability to the formation and accumulation of inconveniently large quantities of semi-solid deposits. They may consist of thick tar, formed by products leaving the generating apparatus at a temperature far below a proper working heat, which obtains to a greater or less extent during the interval between the introduction of the charge and the heating-up of the whole mass; by fine dust carried forward mechanically from the charge by the current of gas; by pitch and finely-divided carbon produced towards the end of the carbonizing period; by excessive secondary decomposition of gases and oils, or by the deposition of ammoniacal salts. Any one or all of these conditions may obtain, according to the quality of the material and the working conditions. The result is usually a conglomerate having dust, finely-divided carbon, or crystallized ammonium salts as a basis, mixed with heavy oils sufficient in quantity to confer a viscid character. Sometimes these troubles are so acute as to cause interference with regular working, and waste of gas to an extent sufficient to necessitate a reduction of the supply pressure to the district. They are more in evidence in cold weather, which usually means the maximum demand—being favoured by attempts in the direction of forcing the productive pace. And in mild cases, where no serious inconvenience is experienced, and apparently no call for special remedies, there is an appreciable deterioration both in quality and quantity of gaseous and liquid products, and a more rapid accumulation of carbon in the retort, necessitating more frequent cleaning periods, with accompanying loss of productive capacity, and prejudice to the working life of the retort-setting than would be necessary under better arrangements.

That these troubles are to a large extent brought about by continuous oscillation of pressure in the retort and ascension pipe, caused by bubbling of the gas through the seal in the hydraulic main, is a matter of common knowledge. It does not pass away in a smooth even flow, but in rapid gulps, each preceded by an accumulation of pressure, and followed by an interval of exhaust. Under a heavy seal, gas may be forced through the walls of the retort, reducing the make per ton and encouraging the formation of carbon during one extreme, and furnace gases may be aspirated during the other. Thus both quality and quantity may suffer, and the high percentage of nitrogen, as compared with a trifling proportion of free oxygen, observed in some samples of gas, is accounted for. The oscillation increases the friction and rubbing contact with incandescent and highly-heated surfaces, which tends to the production of pitch and carbon, at the expense of valuable oils and illuminants.

Frequent attempts have been made to meet these defects by substituting valves in place of the hydraulic seal. But, as a general rule, the difficulties introduced with such arrangements are greater than the evils that they are intended to cure. As a consequence, they have been discarded in many instances, and at best enjoy a limited degree of favour. The most satisfactory working is secured when rich coal is used that will produce sufficient thin oily tar to lubricate and clean the working surfaces. While valves are advantageous so long as the retorts are new and in sound condition, the absence of the seal is an objection when they are old and leaky. There may be a back passage and loss of gas by leakage into the furnace, or depreciation of quality by aspiration of furnace gases, or, as above observed, a combination of the two defects. In these circumstances, there is room for an arrangement that will allow a sealed or an open outlet to be used at will, on all or on any one retort independent of the others; and this without valves or other moving parts exposed to the direct current of gases. The means by which I propose to meet this requirement can be modified to suit any size or shape of retort or working conditions. There are no rubbing surfaces exposed in the gas-ways; each retort can be used with or without seal, independently of the others; and facilities are provided for cleaning the passages, without stoppage or interference with the make of gas.

The hydraulic or common collecting gas-main is divided into compartments or pockets, one for each contributory pipe, by division plates that may either cover the whole section and entirely separate each compartment from the others, or extend only to a height sufficient to maintain the hydraulic seal—leaving free clearance for the gas to pass to one common outlet, as in the ordinary hydraulic main. Details are varied to suit the quantity of gas passed per hour as calculated on local conditions, and not on the make of purified gas at ordinary temperatures, the quality as regards liability to deposit pitchy matters, and the arrangements for drawing and charging. If these admit of completion within the space of one or two minutes, the second modification may be used; but the first is preferable for vessels, such as coke-ovens, that must stand-off for some appreciable time.

A supply pipe is carried along above the collecting main, with cocks and branch pipes according to the modification used, connected to an overhead cistern containing a supply of suitable liquid, which in most cases would be ordinary ammoniacal liquor; and a draw-off with controlling cock is connected to the lowest part of each compartment and to a common collecting pipe leading through a seal-box to the store well. All the cocks for liquid can be fitted with lever handles set at 45°, which can be easily controlled by a hooked rod from the ground or charging floor, and also serve as indicators by which the position, whether open or shut, can be observed at a glance.

Figs. 1 and 2 show the application to a bed of six horizontal retorts. The ascension pipes are marked B, and the hydraulic D. F are the division plates, G the liquid supply, H draw-off cocks, while a common overflow is shown at J. In the first instance, the whole is charged to overflow level, by allowing G to remain open until there is a free overflow at J. One common filling cock may

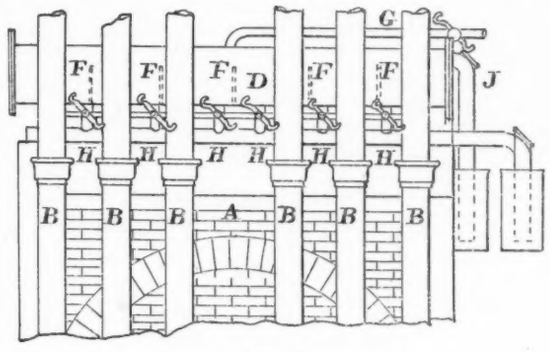


Fig. 1.

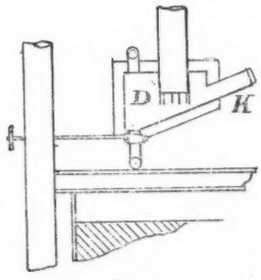


Fig. 2.

Fig. 3.

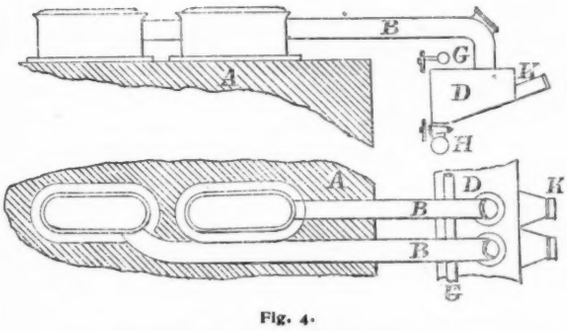


Fig. 4.

HUMPHRYS' IMPROVED CARBONIZING PLANT.

be fitted as shown, or separate ones to each compartment may be provided. In the first case, the liquid overflows from one compartment to the next, and so reaches the overflow J. As each retort is charged and the lid secured, its corresponding draw-off can be opened and the compartment emptied—making a free way for the gas. If a seal is required on one or more of the retorts, the draw-off is not opened.

A few minutes before any of the retort lids are slacked for drawing and charging, all the draw-offs are closed, and the seal is renewed by filling to overflow as at first. The "set" of the levers, whether to right or left, enables one to ascertain at a glance if they are open or shut. Being moved at frequent intervals, they are not likely to "stick;" and, when using the seal, as in the ordinary hydraulic, the filling and draw-offs afford a convenient means of thoroughly flushing-out at intervals, preventing accumulations of pitchy matters. The draw-offs and their collecting main may be protected from heat by suitable lagging.

As a means of reducing oscillation when working under seal, the dip-pipes are fitted with a fringe made of thin iron rod; and this arrangement would be advantageous if applied to any hydraulic

main. [See fig. 3.] Many of the advantages above enumerated can be secured by fitting one common filling and draw-off to existing sections of hydraulic main.

The cleaning doors are of flat D section; the bottom forming a straight line with the slope of the hydraulic. The passages may taper on plan, the wide end towards the hydraulic. They admit of raking out any accumulations when the compartment is under seal without interference with the make of gas, and, like the foregoing, may be applied with advantage to any hydraulic main.

Fig. 4 shows the application to a pair of vertical retorts, with lettering as in figs. 1 and 2. It facilitates the working of twin or coupled retorts, in connection with blue gas, steaming, or enriching. If one compartment of the pair is sealed and the other open, the contents of both pass off through the outlet from the second; but the working can at any time be reversed.

THE NATIONAL BENZOL ASSOCIATION.

We are notified by the Acting Secretary of the National Benzol Association that, at the general meeting of the benzol industry which was held in Caxton Hall last Tuesday, various alterations were made to the revised constitution and rules [see *ante*, p. 164]. In these circumstances, the Association will in due course be issuing a further revised set of rules The following are the modifications which were agreed to last Tuesday.

Rule 4, Clause (*g*)—One of the Objects of the Association—to be Entirely Eliminated.

To promote a limited company or companies, so far as may be considered necessary or desirable, for the furtherance of all or any of the objects of the Association.

Rule 9 to Read—

A special general meeting may be called at the request of any three members of the Executive Committee, or of all members representing collectively an annual subscription of not less than £250; fourteen days' notice being given to the Secretary at the office of the Association.

Rule 15, an Additional Clause No. (7).

Representatives of the gas industry nominated by the National Gas Council proportionate to their relative make of crude or refined benzol.

Rule 22 to be Entirely Eliminated.

Members shall abide by the scale of prices issued by the Association; and no member shall take a lower price than the current schedule without first reporting the matter to the Executive Committee and obtaining the sanction of that Committee.

Rule 26 to Read—

The accounts of the Association shall be made up annually to June 30, and shall, after audit, be examined by the Executive Committee, and shall be submitted to the annual general meeting. A copy of the accounts to be sent with the notice convening this meeting.

It was pointed out by several representatives of the gas industry that Rules 4 and 22 were preventing many gas undertakings from joining the Association; and the Committee hope that now they have been removed all gas undertakings producing crude or refined benzol will see their way clear to become members of the Association as soon as possible.

BENZOL FOR MOTOR SPIRIT.

Specification of Quality.

The Association have drawn up the following specification for benzol for use as motor spirit.

1.—*Specific Gravity*, ·870 to ·885.
2.—*Distillation Test* (*by Flask*).

Benzol shall give a distillate of not less than	75 to 80 p.ct. at 100° C.
" " " " "	90 p.ct. at 120° C.
" " " " "	100 p.ct. at 125° C.

3.—*Sulphur*. The total sulphur shall not exceed 0·40 p.ct.
4.—The benzol shall be entirely free from water.
5.—*Colour*. Water white.
6.—*Rectification Test*. 90 c.c. of the sample shaken with 10 c.c. of 90 p.ct. sulphuric acid for five minutes should not give more than a light brown colour to the acid layer.
7.—Benzol shall be entirely free from acids, alkalies, and sulphuretted hydrogen.
8.—Benzol shall not freeze at 25° Fahr. below the freezing-point of water.

Scottish Gas Supply Statistics.—There has been issued by the Council of the North British Association of Gas Managers the "Statistical Report of the Gas Supply of Scotland," from May 15, 1917, to the same date in 1918. A list of officers and members of the Association is bound up with the pamphlet.

Midland Junior Gas Association.—The Ladies' Meeting of the Midland Junior Gas Association, last Saturday week, was a great success; about eighty members and friends being present. Mr. T. H. Poulson (the President) was in the chair. Vocal items, pianoforte solos, and a sketch by members of the Birmingham Corporation Gas Department Council House Ladies' Staff, provided a bright and very entertaining evening.

SECONDARY REACTIONS OF OXIDE OF IRON PURIFICATION.

SULPHUR AND STEAM.

By G. Weyman, M.Sc., A.I.C.

In studying the process of oxide purification, it is necessary to keep the secondary reactions in mind, and to understand what they may lead to under favourable conditions. An example of how one of these reactions may assume prime importance is given below.

An old heap of partially spent oxide, originally bog iron ore, which had been lying some time under cover, was used to fill a box. Since its previous use, ammoniacal liquor had been thrown over it; and the oxide heap was covered with lime dust. A few hours after the gas had been turned on to the box, comparatively large quantities of steam, sulphur dioxide, ammonia, and hydrogen sulphide were found at the outlet; and the temperature was rising very rapidly. Cooling, by cutting the box out of circuit, and then placing it last in the series, made no difference—the temperature again rose. The inlet gas was found to contain only the normal quantities of hydrogen sulphide, water vapour, and traces of ammonia, with 0·5 p.ct. of oxygen. Finally, after standing some time, the box was opened, when the oxide promptly took fire, and was only got out and disposed of with considerable difficulty.

The explanation of this striking experience lies in the decomposition of steam by the sulphur vapour under the high temperature developed. Even when sulphur is boiled with water, the sulphur vapour volatilized in the steam decomposes the latter, as described by Cross and Higgins [see "Journal of the Chemical Society," 1879, p. 250], in accordance with the equation:

$$2S+2H_2O=H_2S+SO_2$$

The hydrogen sulphide evolved can be easily detected at the open end of the vessel.

The reaction is reversible, and proceeds from left to right to an increasing extent as the temperature rises. Since the hydrogen sulphide and sulphur dioxide are evolved in equivalent quantities, if the products are cooled slowly in a confined space below 100° C., sulphur vapour and steam are removed from the system by condensation, the action is reversed, and no hydrogen sulphide can be detected. When a third substance is present—such as ferric hydroxide—the sulphur dioxide may be removed, leaving an excess of hydrogen sulphide.

The formation of the sulphur dioxide is harder to detect. Since both products are reducing agents, and can only be looked for in a current of steam, it is difficult to isolate them. Rapid condensation gives very small amounts of precipitate with barium chloride, which by the time they are examined have changed to sulphate. Cross and Higgins were obliged to resort to indirect means of proof; but, even so, the results were always expressed in terms of sulphate, and not sulphite.

By using higher temperatures—above the melting point of sulphur—the author found that the reaction becomes much more rapid; and by heating both sulphur vapour and steam to about 200° C., by passing them through a hot tube, the sulphur dioxide is formed in sufficient quantities to be quite obvious by its smell and acidity. When the products were passed into water containing cadmium carbonate in suspension the sulphide was easily separated. After a few minutes, the solution was removed and filtered, when a large quantity of sulphite was found in the filtrate, with thiosulphate, but no sulphate.

It might be emphasized that solid sulphur is not the reacting substance, but sulphur vapour. Cross and Higgins found that the sulphur formed by the reversed reaction was insoluble in carbon disulphide. Hence there should be reason, as was recently pointed out, for suspecting the presence of insoluble sulphur in spent oxide, which might be quite appreciable in amount in certain circumstances.

That this reaction takes place in ordinary technical practice can be shown by opening a heap of freshly discharged spent oxide. The oxide will be heating-up by oxidation, and steam will be found containing hydrogen sulphide. Further, the freshly discharged oxide will be (or should be) slightly alkaline. But after a short time it will gradually change to an acid reaction, due no doubt to the effect of sulphur dioxide. The acidity is not, as a rule, sufficient to warrant any treatment, as a return to the boxes will soon restore the alkalinity, if the usual trace of ammonia is present in the gas. It is evident that this is a possible way for sulphates and thiosulphates to form, which would accumulate in the spent oxide.

As a matter of works experience, it has often been noticed how a box of oxide will absorb all the hydrogen sulphide from the gas except the last trace, and will maintain this condition some time. It seems likely that the remnant left is simply the result of this secondary reaction, and that the oxide is really absorbing all the original hydrogen sulphide entering. If this is so, the temperature of the last box should be kept fairly low, and no extra steam admitted.

Again it is a matter of common experience that clean gas will sometimes pick up a trace of hydrogen sulphide from a revivifying box—an occurrence usually put down to a leaky valve. But,

in view of the above, this explanation is certainly not the only possible one.

Finally, the analytical side may be considered. In moisture determinations, as previously pointed out, the temperature and time of drying should be carefully watched [See Colman and Yeoman, in "JOURNAL" for Jan. 21] ; and it will be obvious that the wetter the oxide the greater will be the loss of sulphur. Lead acetate paper placed beside spent oxide containing 11 p.ct. of water was tinged in less than one-and-a-half hours, at 25° C.

Further, in fouling tests of oxide, in which foul gas is passed into a quantity of oxide till the issuing gas shows foul, the results may be of no use whatever, since enough hydrogen sulphide may be formed by the secondary reaction to contaminate the issuing gas before the oxide is in any way spent. In fact, the greater the activity of the oxide, the greater the liability for this to occur.

MANUFACTURE OF CYANAMIDE.

Following up the announcement that the Nitrogen Products and Carbide Company are to start the production of cyanamide at Workington, the "Money Market Review and Investor's Chronicle," in their current issue, give some further particulars with respect to the scheme which they have received from the Company. It is pointed out that the manufacture of cyanamide [which is, perhaps, better known in this country as nitrolim] necessarily involves the fixation of atmospheric nitrogen by means of electricity; and the Company have been for many years producing large quantities at their works at Odda, in Norway, where hydro-electric power is used.

The process of extracting nitrogen from the air by means of electricity was widely employed in Germany during the war; and in a previous comment, our contemporary remarked that "the only defect of the German variety was that, as a powder, it was difficult to handle," and by the output of the Workington factory, "assuming it to be of the granular variety, the outlook for nitrate will be seriously affected." On their later information, they now say that the powder form is that which is invariably obtained in the first instance. The Nitrogen Products Company are the only one who have succeeded in producing a satisfactory granular variety, which process they have invented and patented. The main difference between the operations carried out in the Norwegian works and the projected scheme at Workington is that in the latter case the electricity is to be generated by gas-fired boilers instead of by water power. The coal is to be carbonized on the spot in the most up-to-date and scientific manner; the benzol, toluol, and ammonia being recovered and utilized to the fullest possible extent. The gas from the coal will be employed to raise steam to drive turbines for generating the electrical power; and the coke will be used in the manufacture of calcium carbide in the electric furnaces—this carbide being in turn converted into cyanamide by causing it to combine with atmospheric nitrogen. In addition, the various tar products will be worked-up for industrial purposes. Reference was made on p. 225 of the "JOURNAL" for the 4th inst. to the projected undertaking at Workington.

Industrial Councils, Reconstruction Committees, and Trade Boards.

The Ministry of Labour has issued a Directory of Joint Standing Industrial Councils, Interim Industrial Reconstruction Committees, and Trade Boards, with an index of members. The Directory has been prepared primarily for the use of members of these bodies and Government Departments. The index shows that up to the present 53 bodies of the various orders have been brought into existence; and the names of members and officers are appended. The bodies having nearest association with the gas industry are the Chemical Trade Joint Industrial Council, the Interim Industrial Reconstruction Committee for the Fertilizing Trade, and the Interim Industrial Reconstruction Committee for the Patent Fuel Trade. The Secretary of the Chemical Trade Joint Industrial Council is Mr. R. Lloyd Roberts, of Messrs. Brunner, Mond, & Co., Ltd., of Northwich. All the employers' representatives are drawn from the Chemical Employers' Federation; and the workmen's representatives from some thirteen unions, among which are the National Union of General Workers, and the Amalgamated Society of Gas, Municipal, and General Workers. The Secretary of the Interim Industrial Reconstruction Committee for the Fertilizing Industry is Mr. I. King Stewart, of the Fertilizer Manufacturers' Association, of 68-70, Fenchurch Street, E.C. Noticed among the employers' representatives is Mr. F. C. O. Speyer, of the Sulphate of Ammonia Association. The Secretary of the Interim Industrial Reconstruction Committee for the Patent Fuel Industry is Mr. J. W. Wyatt, of the Ministry of Reconstruction. The employers' representatives are drawn from the Patent Fuel Manufacturers' Association, Cardiff.

Temporary Increase of Charges Act.—The Board of Trade have made Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, in favour of the Falmouth Gas Company and the Ogley Hay and Brownhills Gas Company, Ltd.; while applications for Orders have been received from the Comber Gas Company, the Gorleston and Southtown Gas Company, the Great Yarmouth Gas Company, and the Thorne and District Gas Company.

YORKSHIRE JUNIOR GAS ASSOCIATION.

A Meeting of the Yorkshire Junior Gas Association was held on Saturday last, at the Leeds Institute, Cookeridge Street, Leeds. Mr. E. L. OUGHTON (the President) occupied the chair, and there was a very good attendance, to hear a paper read by Mr. H. Rhodes, of Bradford.

The PRESIDENT, in opening, said this was Mr. Rhodes's first paper, and he hoped his example would be followed by others who had never before contributed to their "Transactions."

Mr. RHODES, who was very warmly received, then read his paper on

SOME DISTRIBUTION TROUBLES.

Having been invited to give a paper before the Association, I thought a few experiences with distribution troubles we have met with might lead to a discussion which would be helpful.

A MYSTERIOUS DROP IN PRESSURE.

The first I propose to relate is on a short section of main close to our Valley Road works, supplied by about 500 yards of 5-in. diameter main. This main is not taken off the direct town supply, which passes the locality, but is from another governor, and, we understand, was specially laid many years ago, so that advantage could be obtained of a slightly higher working pressure. After the outbreak of war, a national shell factory was established in one of the works in this particular locality; and two separate supplies had to be laid on from the direct town supply to meet their requirements. Later, a large canteen was built to supply meals for the munition workers; and a 3-in. supply was taken off the 5-in. main referred to. For a long period after this canteen was opened, all was in perfect order; but later we received complaints of lack of pressure. Men were sent to see what was wrong; but on their arrival everything was in order, and the pressure normal. This occurred several times; and, as we knew no other supply had been connected to this main since the canteen was opened, we could not understand the complaint. When I took pressures at various points, all were normal; and we then fixed a pressure register. Changing the pressure chart at 2 p.m., when everything at the canteen was out of use, the pressure suddenly dropped, and in the course of a minute or two returned to normal. It was just as if someone had opened the main end.

I then set out to find the cause, and visited the works supplied by this main to see if any plant had been installed of which we were not aware. I found that at an adjacent dyeworks they had had a breakdown on a cloth singeing machine which was heated by coke, and had resorted to a machine using gas, which had not been employed for several years. This machine was fed by a 3-in. diameter pipe, and as each piece of cloth passed through it, the gas was shut off. Further, the machine did not work all day, but was used intermittently. This accounted for the sudden drop in pressure and the equally sudden return to normal at the canteen, and also explained why we were so troubled in finding the reason for it. We then put the dyeworks main on to the trunk town supply, and have had no further complaint.

GAS-ENGINE COMPLAINTS.

As may be supposed in a large area of supply, we get frequent complaints of poor pressure, &c., on gas-engine supplies; and I propose to quote one or two examples which show how varied may be the causes of these troubles.

In the first case, a gas-engine was reported to be fully up to its work during daylight hours, but at other times part of the plant had to stand, owing to the engine not having enough power. I first tried the pressure at 2.30 p.m., to see what was available when the engine was running satisfactorily, and I obtained 30 10ths on the meter inlet and 29-10ths on the outlet. The engine was then running fairly well; but I noticed that they had fastened the regulator of the engine governor so that the engine took gas at every stroke. At 4.15 p.m., one large machine had had to be shut off, as they could not keep up the proper speed; and on trying the pressure, I obtained 28-10ths on the meter-inlet and 27-10ths on the outlet, while the engine was not running at all well. As I was suspicious that the engine gas-valve was not opening soon enough, I put my penknife blade between the valve and the "pecker," thus causing the engine to take the gas a little sooner; and I found I could get the speed up to normal—proving that the valve was not properly timed. The engine was then stopped; and seeing the "pecker" was badly worn, I fixed a spare one, and, after putting the engine governor into action, restarted the engine. It ran well for a little while, and then pulled-up, owing to the fact that, with the engine taking more gas than before, it caused more oscillation on the pipe feeding the ignition-tube, and (as the tube had a very keen flame) caused it to light-back at the nipple, cooling the tube, and eventually pulling-up the engine. After regulating the flame, the engine was again restarted; and it was possible to run all the machines at full speed. I again tested the pressure, and obtained 26-10ths at the meter-inlet and 25-10ths at the outlet—thus showing that the trouble was not due to the low pressure, The actual seat of the trouble was the poor mixture of gas and air for the charge, caused by the worn "pecker" not operating the valve at the

proper time. The proper timing of the gas and air valves is a frequent cause of trouble.

Another type of complaint is that of trouble to adjoining consumers caused by gas-engines; and in the case I wish to bring to your notice, we had a fairly regular pressure of between 25-10ths and 30-10ths. The engine had run without any complaint for many years; and on looking at the gas-bag, I saw that it had been packed at the back between the valve-spindle and the wall, thus causing it to not shut-off when it was full. The engine was therefore drawing gas straight from the meter and service, with a consequent oscillation on the main. After removing all the packing, the trouble was largely overcome; and on inquiry I was informed that when the engine was overhauled, the repairers had put in the packing so as to ensure a greater volume of gas for the engine. The proper thing to have done was to alter the valve in the gas-bag, which is a very important point. The bad setting of these valves is a constant source of trouble to a distributing department. When an engine has been working for a few years, I often find that the diaphragm of the gas-bag has stretched, thus making the valve not open quickly enough; consequently, the engine does not get a proper charge, and is constantly drawing its gas directly through the meter, as the valve is never entirely shut-off. In one case I came across, when the diaphragm was taken-up a little, so that the valve opened properly, it increased the hourly consumption by over 100 c. ft. The engine ran better, and we had less fluctuation on the meter-outlet. The same effect occurs if the engine-rings are badly worn, so as to allow waste of gas by slipping. In such a case, the valve has been set to allow only the amount of gas necessary when the engine was in good condition; and when it requires more gas to make-up for the waste, the quantity cannot pass the valve-opening.

With a similar complaint of jumping lights caused by a gas-engine in the neighbourhood, I found only 2-10ths oscillation on the main; but still the light of an inverted burner nearly went out each time the engine drew gas. The pressure on the service end only showed 2-10ths to 3-10ths oscillation; but on the fittings, 5-10ths was indicated. This was due to the fact that the lead inlet-pipe nearer to the meter was badly flattened, thus causing a reduction in the quantity which could pass through, and, a consequent lowering of the pressure at the lighted burner. This accounted for the greater fluctuation. Such fluctuation is always worst on a small main—even if it is of sufficient capacity to supply all that is required—owing to the rebound on the main when the valve of the engine gas-bag shuts. This is very pronounced in the case of incandescent burners when they are set to give a keen flame. I have regulated, with good results, many burners to overcome this trouble.

Another complaint of poor pressure was discovered on inspection to be due to the fact that the fitter had connected the gas-bag the wrong way; and the engine was drawing its supply through the holes in the valve of the bag. This was on a large installation comprising two 80 B.H.P. engines; and before the connections were made right, I was again called to the place, as there had been an explosion in the gas-bag—the diaphragm being blown clean away. I found that, in order to dry the plugs from the magneto, the fitter had lighted a small gas-ring fed from the same pipe. This had burnt at the jets until nearly all the gas in the pipe had been consumed, when an explosive mixture had formed which had fired-back into the gas-bag. As this occurred before the engines were started-up, there was no pull on the bag to draw the valve in, and so admit any more gas—hence the mishap. The engines had run for a day or two previous to the accident; but the circumstances were different, as, when running, the engines sucked the valve in, and so obtained a regular but limited supply, which was the cause of the complaint being made to us. Needless to say, the gas-bag was quickly connected the proper way, and we have not heard anything since about the shortage of pressure there.

New Appliances and Adequate Supply.

There is one trouble which all gas undertakings will get more or less—especially during the present shortage of coal and labour, with consequent decreased pressures—but it is one which district inspectors or meter readers could help to some extent by reporting when new aud additional appliances are fixed in workshops and factories. As most of you will know, if there is a gas supply in a building, some plumbers will fix any apparatus to it, irrespective of the capacity of the service or the size of the meter; and then (probably after some time has elapsed) the gas department are informed that there is a shortage of pressure. I propose to state a case of this character to show the necessity of attention to these matters.

At a large engineering works in our area, wholly engaged on munition work during the period of the war, there were several meters fixed in different parts of the works; and I have taken three of them to illustrate my point. A 200-light wet meter, 4-in. inlet-main, 3-in. outlet-main; an 80-light dry meter, 2-in. inlet from the same 4-in. main, 2-in. outlet; and a 20-light wet meter, supplied by a separate 1¼-in. service-pipe. On testing, I found that the 200-light meter was passing 3120 c. ft. of gas per hour, with inlet pressure 22-10ths and outlet 6-10ths; the 80-light meter was passing 800 c. ft. per hour with inlet pressure 20-10ths and outlet 13-10ths; and the 20-light meter was passing 210 c. ft. per hour, with inlet pressure 22-10ths and outlet 16-10ths. The 200-light meter was supplying two sections of the works—the pattern shop and the foundry; and the 3-in. outlet main ran nearly to the far end of the works, where it was reduced to 2-in. Owing to war work, more gas was required in the foundry; and the manager of this department fixed a booster on the 2-in. branch from the 3-in. outlet main which supplied the foundry. By so doing, he got a satisfactory supply in his own department, at the expense of the remainder of the works supplied by this particular meter; and it was from this portion of the works that we got the complaint of shortage of pressure.

I reported this state of affairs to the chief engineer of the works, who asked me to submit a scheme whereby they would have a proper supply to all departments. I accordingly set out the following: A new 600-light dry meter to replace the old 200-light wet meter; a 200-light dry meter to replace the old 80-light dry meter; and a 50-light dry meter to replace the old 20-light wet meter. The new 600-light meter was to be supplied by a 6-in. main with 6-in. outlet to a convenient point, with the booster fixed on this main so as to increase the supply to both departments. A back-pressure valve was to be fixed between the inlet and outlet of the booster, and all the branch pipes to be taken off the 6-in. boosted main. The new 200-light meter was to be supplied from the existing 4-in. main, with 3-in. outlet and 3-in. branches to the furnaces, &c.; and the new 50-light was to be supplied with a new 2-in. main.

This work was carried out exactly as proposed; and there is now a good supply throughout the two departments, though our initial pressure is no greater than before. The reason why the booster was retained under the new conditions was that, owing to the long lengths of the existing piping in these two departments, it was cheaper to boost-up the available pressure than to re-pipe the works. It is such cases as these that cause unaccounted-for gas returns to be high, as a meter passing three times its rated capacity will not give correct registration. This not only applies to large consumers, as here described, but to small users also; for we have had many cases of large appliances working on small meters with similar results.

Poor Lights and Mantle Breakages.

Of quite another character is the following account of a complaint of poor lights and excessive breakage of mantles in a munition works—a feature which was very pronounced on Sunday nights. We were asked if the pressure was altered or in what way we could account for the trouble. The lighting system in use was a local firm's high-pressure installation, working at 8-in. pressure, with 500 c.p. lamps containing three burners each, of the Grætzin type. These lamps were on the preheater principle, and had one regulator only to each lamp. I tested the outlet of the compressor during the week, and obtained 80-10ths; regulated two particular lamps in the works; and arranged that these lamps should not be touched until I saw them on the Sunday night. The man in charge of the lighting said that when putting new mantles on a lamp sometimes two of the three would be blown off, and also that he could not regulate all three burners to give even results. This was, of course, due to the fact of having only one regulator for the three burners. I inquired what he did if a gauze dropped out of a burner, and was told he did not think it was any good, and therefore left it out. Most of the lamps had one or more gauzes missing, so that it was impossible to regulate them to burn properly. I arranged that all the burners should have gauzes in before the following week-end. When I called on Sunday night, I found that the pressure on the compressor outlet had increased 5-10ths (to 85-10ths), which was an advantage. The lamps I had regulated were quite right. I took two other lamps at random, and found the man had been able to regulate them properly with satisfactory results, and there had been practically no breakages. On inquiring a few weeks later, I was informed that they had had no further trouble; and the mantle bill was reduced to reasonable dimensions.

There was no alteration in the pressure on the district in which these works are situated; and the main cause of the complaint was the absence of the gauzes from the burners. The extra 5-10ths pressure noted would cause a greater injection of air, and the flame would be more aerated, and liable to ignite at the nipple. This would not have occurred if the gauzes had been in, because they would have acted as a baffle to the air. Without the gauze, the open nozzle would allow a greater percentage of air to be injected through the air-inlet than the percentage of gas passing through the nipple needed—thus making a more explosive mixture.

Faulty Distribution.

Another complaint of poor supply proved on investigation to be due to faulty distribution; and as the circumstances were rather curious, perhaps the relation of them may be of interest. When the undertakings of the Eccleshill and Idle Gas Companies were purchased, about sixteen years ago, these areas were connected-up as far as possible to the Bradford distributing system, and, in addition, a 12-in. main was laid into both works for the purpose of drawing gas by means of an exhauster direct into their holders from the Bradford system—a 16-in. main being taken for the purpose from a 24-in. trunk main. Most of the old Eccleshill area is supplied direct from this 16-in. and other mains; while the Idle district is chiefly supplied from the Idle works holders. During the winter seasons previously these works have been making gas as usual; and it has only been necessary to draw gas from Bradford during the summer months. But, owing to the war, it has not been possible to start these works at all during the last three winters; and consequently the necessary supply has had to be drawn from Bradford during the winter also. In this area there are several large mills; and we received a complaint of shortage

of pressure during mill-lighting hours, both at morning and night. On testing this particular mill, we found 25-10ths pressure before starting-time; and this was rapidly drawn down to 12-10ths when all was lighted-up before 7 a.m.

On examining the works pressure charts, it was found that the pressure on the district was lower than it ought to be; and the chart on the drawing main showed that the cause of the trouble was there as the fall in pressure on the district commenced at the same time as the exhauster at the Idle works commenced to draw gas from Bradford. As it was customary to have 6 in. exhaust on the drawing main at Idle (two miles away), the supply for the district from the 16-in. main was then insufficient to keep up the pressure. Arrangements were therefore made to only draw gas to the Idle works out of lighting hours—that is, during the day and after 10 p.m. at night—with the result that a more even pressure was maintained in this particular district.

A complaint from some house property in the district was at first put down to the same cause; but no improvement being found after the above alteration was made, it was necessary to make further tests of the pressure. At the lamps in the main road, I obtained 37-10ths at about 6.30 p.m., and then tried in one house where the normal consumption was fairly large. In this case, I was surprised to find only 13-10ths, and on a subsequent examination of the service-pipes back to the outlet from the main road, discovered there was a considerable accumulation of naphthalene at this point. I find a ready method of obtaining pressures in such instances as this is to prick through the lead inlet and outlet pipes; and when all consumption is on, it is a simple matter to get a good reading on a gauge with a short piece of rubber tube held over the hole thus made. These tiny holes are easily made-up by cutting a shaving of lead on each side of the hole, and tapping it well over. This manner of obtaining pressures is very useful in many cases, as a quick test can be made of the condition of the meter. For example, a complaint of lights jumping on a dry meter may not be due to the usual water in the fittings, but may be accounted for by the meter-valves sticking; and observation of a gauge for a few revolutions will often give evidence of this trouble. Similarly, in the case of wet meters, the faulty condition of the drum can be identified by the pressure being gradually drawn down, followed by a quick return as the next cell gets above the water-line.

DISCUSSION.

The PRESIDENT said it had been of value to hear Mr. Rhodes explain some of his methods of overcoming difficulties.

Mr. E. A. LEASK (Leeds), referring to the breakdown of a cloth-singeing machine heated by coke, and the temporary employment of a little-used gas-machine, said it was to be hoped that, now that supplies had been put right, the gas-machine could be used regularly, and the coke-machine left as a stand-by. The question arose in his mind as to what was the necessary pressure to run a gas-engine successfully? Some years ago he had been "up against" running a gas-engine on a pressure of 3-10ths or not at all. This was done by charging the cylinder of gas separately, and igniting the ignition tube from this cylinder, and turning the engine round. Trouble in this matter was pretty nearly always either a fault in the engine itself or the ignition was unsteady. Mr. Rhodes, it seemed, had been successful in determining his complaints by means of his pressure gauge. This was all very well when the gas was right; but it was no use ignoring the fact that gas consumers were convinced that they had not, in recent times, been getting the gas of pre-war days, and the service men could not pretend to contradict it. If the quality of the gas was reduced, they would find that in practically all cases the appliances needed re-adjusting. If they had to be content with this lower quality gas, they would be able to manage pretty well, if only it was fairly constant in quality and pressure, even though of a low quality—they could accommodate themselves and the appliances to the reduced quality. When the examiner found that the pressure-gauge did not show a reduction in pressure, it was for them of the distribution department to impress upon those responsible for the quality that it should be at least fairly regular and constant. As to the question of fixing new appliances to existing gas services, without the department being advised, this was always a great pity. In Leeds, when an extension of buildings was sanctioned by the Corporation, a list of any such prospective works was supplied to the Gas Department; so that before the building was completed the gas people could make proper arrangements.

Mr. F. PYKETT (Halifax) said, in reference to the complaint about lighting, he had had a somewhat similar experience, though there was no breakage of mantles in his case. The group of mantles—it was a number of 5-light lamps—were lit inside the tip, and the full value of the mantle was not obtained. Examination showed a small hole in the gauze, which caused the flame to light at the gauze itself and not at the tip. They had stocked what were known as a No. 2 mantle and a medium mantle; and he noticed that the fitter had got these mantles mixed, and had put the wrong ones on the different nozzles. With reference to the ignition of the gas-engine, he had got over the trouble of the oscillation by taking the supply direct off the meter outlet. Regarding the supply to Ecclesbill, he thought high pressure distribution would overcome all difficulties in this matter. He had experienced trouble with a high-pressure supply some time ago. The cause was water in the main, and, naturally, he looked for a solution after the stoppage, not before. In this case, however, he found the trouble was with the meter. The high-pressure governors were in connection with a 1000-light meter, and on the outlet of the meter there was a syphon of whose existence he had no knowledge. This was an undertaking to which the department supplied gas in bulk and had no other concern in the administration or supervision. They found there was an oscillation of 5-10th continuously on these governors. He tried various methods of remedying the trouble, but eventually he went to the acting gas engineer of the place—who was the surveyor—and made inquiries about the equipment. He found that there was the syphon on the outlet of the meter. By clearing this, the trouble was overcome. There was one case, some time back, in which his undertaking were asked to supply a 20-light meter for a small canteen. On inquiries, however, he decided to put in a 60-light meter; and he secured also the work of fitting up the whole canteen by being quickly on the job. The people had been advised by their works plumber that a 20-light meter would be quite sufficient.

Mr. E. J. SUTCLIFFE said some of the members might be interested if Mr. Rhodes would demonstrate his method of pricking a pipe for the purpose of testing by the use of the pressure gauge.

Mr. RHODES, demonstrating on a small joint, said, of course, the larger the pipe the better, but with care a 3-8th in. pipe could be safely pierced and closed again when finished with. One could thus get an exact reading on the gauge, and could judge if there was oscillation. To close the pricked hole, and yet avoid carrying a soldering set about, all that was needed was to pare small shavings of lead on either side, turn them over the hole, and tap them up with the hammer. On one occasion, a club architect had advised a 30-light meter, and there was a 1¼ in. service pipe. At the far end of the building, on the night before the opening day, they could not light up. He found the meter was too small, and the pipes in the building were too small, especially towards this particular end. He had to get them out of the fix as best he could, and as quickly as possible; so he put in a 100-light meter. This was larger than was actually necessary; but it got over the little friction which was caused through meters. They had to get out with a 2-in. pipe and couple their existing pipe with it. How he had found the pipe was too small was by getting in under loose boarding under the under-drawing, and pricking in in the way he had mentioned. This occurred some time ago; but he mentioned the incident to show that this test could be applied in any part of the building. It was very handy with naphthalene trouble. He had found several cases in which the naphthalene was not at the meter, but sometimes formed (say) in a portion of a bedroom, while everywhere else was all right. One could easily get at it by the pricking method. As to what pressure was required for a gas-engine, it depended, to his mind, whether there was a magneto firer or an ignition tube. With a magneto, he had had engines running at 10-10ths and 11-10ths pressure. As to the poorness of gas, the changed quality, of course, had mostly affected the lighting, rather than cooking and heating. In the latter services, it was pretty easy to get over it. He usually set the apparatus so that there was a soft flame. For lighting, one could hardly do this. In the average decent make of burner, they simply had to show the consumer how the light could be improved by a little regulation. He had not had an exactly similar case to that of Mr. Pykett, but the same observations would apply on a gauze firer. He thought many of the gauzes were being altered now to some composition, and the flame would not be so long and would burn from the seat of the gauze. As to the ignition from the meter outlet, he had not found this very satisfactory. In the case of blowing-off the mantles, to which he had referred, the gauze was really the main thing to prevent firing-back. It had the advantage of conducting the heat away in the same way as in the coal miner's safety lamp.

The PRESIDENT said that, in regard to the necessity of gauzes, his undertaking had had experiences of gauzes from all three standpoints. The modern lamps to-day were the superheated type, in which arose the necessity of the gauzes. They had fitted up a mill which was intended to be equipped with electric light; and they had recommended this type of burner. After the burners had been running a while, the people were charmed with the lights. What then happened he did not know; but complaint came that a lot of the mantles were blowing off. They found that the bulk of the gauzes had been taken out of the burners; and a notice had to be put up that the lamps were not to be tampered with under pain of severe penalties. After this there were no more complaints; and since then they had gone through the mill with the system, and through three others on their recommendation. As to high-pressure service, on the mixture of gas and air, one morning his undertaking received a report of the explosion of a meter at a certain works. Everything about the place seemed to be normal; and the meter was bye-passed, because until the trouble was found out they could not do without the gas. The next morning there was complaint of another exploded meter. It was found that a defect was in the compressor, where the mixing valve had stuck; and whatever variation of gas there was made no alteration at all. This was a matter which accentuated the trouble rather than being the real cause. They took every burner to pieces, and found that the majority of the gauzes were burned through. The firm had had their own men doing the work, and they had, apparently, not troubled about the gauze until it had crumbled right away. About three days later, there was another report of an exploded meter. It was found that the workmen, though told to turn off each light individually, extinguished all in one room by turning off the meter tap, as the easier method. Being a highly aerated mixture, and with broken gauzes in many of the burners, the flame had travelled back; and the explosion took place usually two or three minutes after the lights were turned off. Henceforward the gas undertaking arranged for the whole of the maintenance of this mill's service, and there had been no trouble since. They had trouble at another mill, which had old-type upright high-pressure lighting, and it was traced to the gauzes burning through owing to the alteration of the flame. He wondered if Mr. Rhodes had figures as to the percentage of error in the meters he tested at their badged capacity. His works had had systematic testing of the meters of the district, and a lot of them were about twice the proper capacity. They had thought they were on the safe side in running at twice the capacity, though they put this as the limit.

Mr. RHODES said he had no actual figures of the kind at hand, but his own firm opinion was that working a meter nearly three times, or even twice, its capacity was not desirable.

Mr. LEASK said it was certainly not advisable to work a meter at even twice its rated capacity, because it worked out, as a matter of fact, that if it was measuring double per hour it was really working four times its capacity while it was drawing.

A hearty vote of thanks was accorded the author for his paper.

VISIT TO THE COKE-OVEN AND BYE-PRODUCT PLANT AT BRYMBO.

The members of the Western Section of the Coke-Oven Managers' Association, last Saturday week, paid a visit to the Brymbo Steel Company's works at Wrexham. The principal object of the visit was the inspection of the coke-ovens and bye-product plant of the Company; but the visitors were also enabled to examine the blast furnaces and steel works as well as the extensive power plant.

On arrival at Brymbo, the party—among whom were Mr. D. V. Hollingworth, F.I.C., F.C.S., the President of the Association, Mr. W. Surtees, the Chairman of the Section, and Mr. S. Stonier, its Hon. Secretary—were met by Mr. E. Escott Wood, a member of the Western Section, and manager of the coke-ovens and blast-furnaces. After a hearty welcome, Mr. Wood escorted his visitors round the various parts of the works, fully explaining all the "reasons of things."

Starting at the ovens, a rather primitive but efficient Robinson-type coal-washery was inspected. There are 33 ovens at Brymbo and 33 at the Broughton works of the Company. They are all of the same type and size—*i.e.*, Semet-Solvay waste heat with three horizontal flues. The weight of the charge (a compressed one), calculated as dry coal, is 4¼ tons and about 3 tons of dry coke are obtained.

A remarkable feature observed here is the method of keeping the hydraulic mains clear. This is accomplished by forcing very weak liquor into the mains at points only a few feet apart throughout its whole length. The water is forced through fine jets which point in the direction in which the gas is flowing. Even the bridge pipes are fitted with jets; the result being to effectually keep cool the whole system, and prevent any accumulation of pitch in the mains. The ascension pipes also are sealed near their bases in a lute through which water is constantly flowing. Much interest was displayed in the old-fashioned ram and charging machine; and many comparisons were made between the former and the present methods of doing things, not always complimentary to the latter.

The condensing plant, consisting of Holmes's tar extractors, Cutler's air and water cooled condensers, &c., was next inspected; and much interest was shown in Mr. Wood's methods of recovering the maximum amount of ammonia. It was stated that both the ammoniacal liquor and the crude benzol from the Broughton ovens, as well as that from the Brymbo plant, are worked-up at the latter place. Consequently, the size of the plant inspected was much larger than might appear necessary.

In the ammonia house, there were several matters of interest. The still employed was of the Solvay pattern, very high and narrow, but apparently very efficient. The ammonia was worked-up to concentrated liquor in a plant of the Brunner-Mond type. It was ascertained that the ammonia in the waste liquor from the plant was kept down to very narrow limits.

The crude benzol producing apparatus was also of the Solvay type; but Rollaston's preheaters had recently been installed to raise the temperature of the benzolized creosote passing to the stills. The excellent colour and quality of the crude benzol made here was a matter of comment. The crude is worked up to rectified products in the same tall Solvay stills, a feature of which is their relatively great height and small diameter. The spirit is moved from one vessel to another by compressed air.

From the bye-product plant, the party passed to an examination of the blast-furnaces; and here it might be well to refer to the extraordinary position of the whole works. The site is on the side of a hill; and this appears to have been excavated in such a way as to provide flat stages upon which the various works have been erected. The coal washery, for example, is situated some 100 ft. above the base of the blast-furnaces; while the coke ovens occupy an intermediate position.

The progress of blast-furnace practice is well shown by the three furnaces existing side by side at Brymbo. The oldest one, built on stone arches, was started-up in the year 1794, and continued in work for almost a century—until 1893. The next one was started-up the same year, and was closed-down in 1908. In 1907, the present working furnace was put into commission, and is capable of producing some 800 tons of iron per week.

The party were shown the economical system of charging the furnace with ore, coke, and lime, all of which are brought to the tops of their respective central containing hoppers by a high-level railway. The hoppers discharge their contents into large barrows which are then hauled to the top of the blast-furnace by an inclined conveyor. It was a fortunate circumstance that the arrival of the visitors happened to coincide with the running-off of the molten slag from the furnace. This gave them some idea of the temperature attained in the blast-furnace.

The power house, which was next examined, is equipped with a Nuremberg tandem gas-engine of 900 KW., and two vertical Westinghouse gas-engines of 500 KW. each. In addition, there are Richardson and Westgarth steam-turbines of 2000 H.P.

Other objects of interest and instruction were five open-hearth basic-steel furnaces, three being of 30 tons capacity and two of 45 tons; also three continuous gas-fired re-heating furnaces, two of which were of the Weardall type, and one by Stein and Atkinson; as well as a 28-in. rolling mill. All the plants were inspected; Mr. Wood and Mr. Davis being most painstaking in explaining the working of the processes in operation.

At the termination of the inspection, tea (kindly provided by the Company) was partaken of, after which

Mr. SURTEES (Apedale), the Chairman of the Western Section of the Association, rose to express the thanks of the members to the Brymbo Steel Company, to the Managing Director (Mr. S. Hollings), to Mr. E. Escott Wood, the Manager of the works, and to Messrs. Davis and Godard. He said that the Brymbo Company was a very old one; and in visiting the works that day, he naturally expected to see some very old and original plant at work. He was, however, sure that he would be in agreement with the members when he said that the visit had shown the Brymbo Company to be an up-to-date one in many respects. It was obvious that the Company had turned their long experience to good account. He thought the coking plant at Brymbo was one of the oldest in existence; and he knew that the former officials there had done a great deal of pioneer work which had been of the greatest service to the industry.

Mr. MYERS (Shelton) also referred to what he termed the "spade" work done by the Company, and contrasted the conditions under which the officials of thirty or forty years back worked with those of to-day. He could not help admiring the pluck and tenacity with which the problems of the industry in its earliest days had been attacked; and he suggested that the officials of the present day were reaping an advantage therefrom. He had great pleasure in seconding the resolution of thanks to their hosts of the day.

Mr. HOLLINGS (who had joined the party at tea) said he was greatly obliged for the kind way in which the resolution had been received. When the visit was first mentioned, he felt that the coke-oven managers would be disappointed on visiting such a museum of ancient plant as Brymbo certainly was. But just as museums were always interesting and often educative, he hoped that the members of the Western Section of their Association had received both pleasure and instruction that day. He believed that, with the exception of the ovens at Crook, in Durham, and possibly some at Northwich, the Brymbo ovens were the oldest in the British Isles. Alluding to the small and ancient character of the ovens, he said that those acquainted with large and modern coking plants would be amazed if they knew the marked difference in operating costs between their own and those of the Brymbo plant. He was sure the latter were often several times higher than other and larger plant. He wondered if the visitors had noticed how little actual progress had been made in benzol plants since 1894. At that early date the Brymbo plant was working much in the same condition as it appeared to-day. At that time the Solvay benzol plant was the only continuous plant in existence; but there were of course many like them to-day. He mentioned the matter to illustrate how the early designers of such plant had so clear an idea of what was required. Proceeding he pointed out that the position of the works was a very awkward one. A great deal of the staff's activities were taken up endeavouring to find a suitable position for the new plant from time to time required; and in many instances the problem had to be solved by taking down certain plant before the new could be erected. However, "it is an ill wind that blows nobody any good;" and he rather thought that the experience which the staff had gained in solving such problems would stand them in good stead, and enable them to make the most of available space.

Mr. ESCOTT WOOD also referred to the pleasure it had given him to welcome his colleagues of the Western Section to Brymbo. He hoped they had derived pleasure from the visit commensurate with the difficulty of getting to Brymbo. Notwithstanding their somewhat isolated position, they at Brymbo had always endeavoured to keep a place in the iron and steel industry; and in the past several important innovations had taken place at the works the visitors had just inspected. In addition to the pioneer work done on the coking plant, he would point out that coke was first used in the blast-furnaces there by Mr. Darby, and that Brymbo was the first place to make a success of the open-hearth process of steel-making. For hundreds of years, the Brymbo estate had been connected with the iron industry. With respect to the coking plant and the yield of products, while their coal did not contain as much nitrogen as others, they aimed at getting the maximum yield of ammonia; and he believed that they were fairly successful in this direction.

Mr. Stonier (Talk o' th' Hill) informed the members that the presentation to Mr. J. West, on the occasion of his leaving the district, had taken the form of a tea service. In making the presentation on Jan. 17, Mr. Stonier said he had conveyed to Mr. West the best wishes of all the subscribers; and since the present meeting was the first that had taken place since the event, he took the opportunity of mentioning the matter. On the proposition of Mr. Lucas, seconded by Mr. Wood, it was resolved that the members present, having heard of Mr. West's appointment to Bargoed, wish him every success in his new sphere.

PROGRESS REPORT OF THE AMERICAN ILLUMINATING ENGINEERING SOCIETY.

The last-issued "Transactions" of the American Illuminating Engineering Society contains the text of a lengthy report by the Committee on Progress, concerning which it is stated: A review of recorded information regarding sources of light, the lighting industry, and other factors germane to illuminating engineering, shows that since the last report of this Committee there has been progress in spite of the fact that the prosecution of the war was absorbing the interest and activities of practically all classes of workers throughout the country. The very necessity of continuous night work in factories, together with the demand for the highest precision and largest output, showed conclusively the value of lighting conditions, and their effect on manufacture.

MANUFACTURE.

The war has caused such a shortage in coal supply that most European countries are experiencing great difficulties in keeping up the manufacture of gas. It is reported that a supply of monazite sand from the Travancore district of India is now being obtained by an American company. Possession of this property before the war by German manufacturers enabled them to figure prominently in the world's supply of thorium for the making of mantles.

An English inventor has brought out what is called a new gas of 350 B.Th.U. per cubic foot (3110 cal. per cu.m.) or less; and considerable agitation as to the merits of his proposals has resulted. He claims the possibility of increasing the efficiency of utilization of the B.Th.U. in good quality, clean, dry coal from 50 to 83 p.ct. Another new development in gas manufacture is the production of gas from straw refuse on the big ranches of North-Western Canada. A retort has been invented for carbonizing straw and other cellulose material, thereby decomposing them into combustible gases, tars, and ammonia. A ton (0·907 metric ton) of straw will give between 11,000 and 12,000 c.ft. (311 and 340 cu.m.) of gas of a calorific value of approximately 400 B.Th.U. per cubic foot (3560 cal. per cu.m.). From every ton of straw are obtained 6 to 8 gallons (22·7 to 30 litres) of tar and ammoniacal liquor. In the three prairie provinces of Western Canada only, it is said that 20,000,000 tons (18,140,000 metric tons) of straw are available annually, which could be used to produce 140,000 million c.ft. (3960 million cu.m.) of gas. Another radical departure in the production of gas is reported from France. A large tonnage of spoiled flour was salvaged from a torpedoed vessel. The flour was useless for bread-making; and it was sent to the gas-works and distilled. From 5280 lbs. (2400 kg.) of flour, 11,200 c.ft. (317 cu.m.) of gas and 1584 lbs. (718 kg.) of coke were obtained—the latter leaving practically no ashes when burned. Tests have been made of the effect on the lighting and heating value of a mixture of artificial and natural gas when the relative amounts of the two gases in the mixture are changed. The results indicate that with a percentage of natural gas from 10 up to 75, the open-flame candle power of the mixture was maintained. With a constantly decreasing artificial gas content, but a rising heat-value, the ratio of the candle power to the heat units remained nearly constant up to a critical point, where the percentage of the natural gas was about 70.

ACCESSORIES.

In England, the birthplace of the open-flame gas-burner, the use of the latter has diminished to such an extent that of gas manufactured "not 5 p.ct. of the whole output is now used for direct illumination" in such burners, according to a statement by a member of the gas engineering profession in a Presidential Address before the Institution of Civil Engineers. It has been pointed out that a lowering of the B.Th.U. requirements for gas, in order to permit of greater toluol recovery, will have a very deleterious effect on gas lighting by open-flame burners.

A new gas-burner introduces directly to the inner surface of the inner cone of the bunsen flame a secondary supply of heated air, independent of that which forms the mixture in the tube. It is claimed that a more perfect gas and air mixture is obtained. The use of large gas-lamps containing as many as fifteen mantles is increasing. A new system of gas utilization has been developed by an English inventor. He has devised what is called a pressure balance, and is said to have obtained a candle-power of from 130 to 150 with a small gas-mantle and a consumption of less than 3 c.ft. (0·085 cu.m.) per hour.

CALORIFIC STANDARDS.

After a careful study of the many tests made by the Inspection Department, the Gas Commission of Massachusetts has tentatively decided to adopt the French standard—viz., 528 B.Th.U. (4700 cal. per cu.m.) as the calorific standard for gas in Massachusetts. Previous to issuing the order, tests were conducted for six months in nineteen gas plants. The question of a universal adoption of 528 B.Th.U. (4700 cal. per cu.m.) as the standard for gas throughout the country has been raised by the United States Fuel Administration. It is pointed out that this would mean the doom of the old open flat-flame burner, as with the elimination of the candle power requirements such a standard is ideal for incandescent gas lighting. The purpose of such an order would be to conserve oil. Agitation for a universal calorific standard and the abolition of the candle power standard is also being carried on in England.

At the request of the United States Ordnance Department, the 600 B.Th.U. (5340 cal. per cu. m.) required average in several New Jersey cities was lowered to 570 B.Th.U. (5070 cal. per cu. m.); it being understood that the permit would be maintained as long as the Government finds it necessary in order to obtain a sufficient supply of toluol. Similarly, at the request of the Federal Government, gas companies in the First District of the New York Public Service Commission may elect to operate under a heating standard for the duration of the war and three months thereafter. An interesting fact has been brought out that in New York City only 20 p.ct. of the gas consumed is used for open-flame lighting purposes. At Minneapolis, the Council agreed to a reduction in the candle-power standard from 15 to 10; but no reduction was made in the heating standard. This action is to last for the period of the war, or as long as the company is manufacturing toluol for the Government.

Experiments by a foreign investigator indicate that illuminating gas exhibits no generally poisonous character towards plants.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Sulphate of Ammonia.

SIR,—With reference to the market report given in your issue of the 11th inst., your correspondent implies that our programme for a Selling Organization aimed only at developing and maintaining the home market.

We wish to state that, while attaching great importance to the home market, we have always considered that any organization which is formed must be in an equally good position to look after the export trade.

A scheme will very shortly be laid before manufacturers designed to meet the needs both of home and export trade.

D. MILNE WATSON, Chairman,
SULPHATE OF AMMONIA ASSOCIATION.

84, *Horseferry Road, S.W., Feb.* 13, 1919.

Gas Investigation Committee.

SIR,—May I be allowed to make a statement which seems advisable in answer to the letter of Mr. J. H. Fairbrother appearing in your issue for Feb. 4. Advertisements of the Gas Research Sub-Committee are always issued through the University of Leeds; but a little time ago, when it was necessary to replace a semi-skilled assistant who was leaving our service to enter upon a degree course here, Mr. James W. Wood, the Research Chemist, made inquiries, by letter, which, in a desire to assist him, were given semi-publicity in a form which was necessarily incomplete. It is neither our principle nor our practice to seek the services of trained scientific men at inadequate salaries; and the time has gone by, I believe, when in any case it would be possible to obtain them, even if they were sought.

With reference to Mr. Fairbrother's more technical questions:

(1) The calorific value of 310 B.Th.U. would, as Mr. Fairbrother suggests, not ordinarily attach to blue water gas with high inerts; and the explanation in this instance is that the blue water gas was made in a carburetted water-gas plant, and, although considerable time was allowed for the cleansing, slight unavoidable carburetting remained.

(2) No admixture of coal and water gas in equal parts is in our list; the gas referred to being described as semi water gas, and the density correctly reported. The difference between calculated and observed calorific value is not explained through heavy hydrocarbons in the case of a pure blue water gas; but slight or accidental carburetting alters the position in this respect.

(3) The differences due to the use of weight against volume measurements of the water and the 0°, 4°, 15°, 20°, or 0° to 100° mean calorie are of quite a second order.

(4) Correction for gas pressure at meter was applied throughout.

(5) There is no great difficulty in reproducing analyses of the accuracy given; but the fact that the analyses add up to within 0·1 p.ct. does not verify them. The presence of C_2H_6, &c., when determining CH_4 and H_2 by the CnO method will vitiate results obtained for CH_4 and H_2, but will not cause deviation from 100 p.ct. in the total. It will, however, prevent accurate calculation of calorific value.

(6) A rapid and sufficiently accurate method of determining primary air would undoubtedly be useful, but is not in our hands.

(7) Departures from standard construction in appliances come up for consideration shortly. The revolving plate with variable orifices would, of course, require the making of a gas-tight joint between the revolving disc and the burner body.

JOHN W. COBB,
Secretary, Research Sub-Committee.

The University, Leeds, Feb. 15, 1919.

Alderman Ball Explains.

SIR,—My attention has been called to the column dealing with "Electricity Supply Memoranda" published in the "JOURNAL" for the 4th inst., in which you criticize, under the heading "A Wrongly-Founded Opinion," certain opinions presumed to have been expressed by me to a representative of "The Times" with regard to the present condition and future prospects of the gas industry; and, as your remarks would appear to convey an inaccurate inference as to what I actually did say, may I ask you to publish this letter in the "JOURNAL" in order that the matter may be put right?

In the first place, I desire to say that I did not make any statement with regard to the heat efficiency obtainable from a ton of coal by the respective processes producing gas and electricity; neither did I notice any reference to this matter in "The Times" report.

In addition to a few generalities, I was invited to express my opinion on two leading questions:

1.—The comparative effect of the abnormally high prices of coal and labour, &c., upon charges for gas and electricity for lighting purposes.

2.—The future prospects of the gas undertaking.

My reply to the first question was to the effect that the gas undertaking was the more adversely affected, and that I was afraid the charges for gas would tend to increase.

I was then asked why the gas undertaking was the more adversely affected. I gave the one simple example of a small proportion only of a ton of coal being converted into gas for lighting purposes as compared with the full ton of coal utilized for generating electricity.

No question was put to me as to the amount of heat energy obtainable from a ton of coal by the respective processes; and no statement thereon was made or thought of. Further, I understood, and believe, that the inquiries referred to Nottingham alone, and not to the whole of the gas industry. I am sorry if any of my statements have given cause for misunderstanding in this direction.

It must also be understood that I was then dealing with the present

position of our own undertaking; and I had in mind the large expenditure necessary to bring the undertaking up to the pre-war standard. Hence I think I was justified in taking advantage of the opportunity to pave the way for any further advances in the price of gas which may have to be declared in the near future.

I replied to the second leading question by stating that I did not consider the immediate future of the gas undertaking as being any too rosy, as, in addition to having to face huge additional expenditure in almost every direction, we might have to face keen competition for the lighting and power consumers in consequence of the introduction of super-electricity power stations, which might possibly be subsidized in some form by the Government.

Speaking generally, I have no fear of gas undertakings losing their heating consumers; but I am not inclined to overlook the present-day reasons given by representatives of electrical undertakings in assumed justification of low prices for electricity used for power purposes. Neither am I inclined to overlook what may take place if the scheme for erecting huge super-electricity power stations is carried out. The nature of their business would then be completely reversed; and who can say that the present basis of electricity charges would not also be reversed so far as lighting is concerned? The power consumers must go to them. At any rate, that is apparently the desire of the Government.

You give me the undeserved credit of being usually far-seeing. But I may say that I am fully alive to the possibility of utilizing the full ton of coal (ash excepted) on gas-works for gas-making purposes and the recovery of residuals; and I can assure you that such project will always command my heartiest support, so long as I am connected with the gas industry. May I also say that I am of opinion that the super-electricity power stations, if erected, should be compelled to consume their requirements of coal in such a manner as to ensure the recovery of the bye-products which are now allowed to pass up the chimney-shaft? Pessimist, I may, or may not, be; but I am in favour of all gas and electricity undertakings being compelled to use their requirements of coal in a scientific manner. The coal reserves of the country are too valuable to waste even on the production of cheap, or rather low-priced, electrical power, which may not after all prove to be the panacea for all industrial evils.

No one can accurately forecast the future developments of either the gas or the electricity industry; and I trust that, upon reflection, you will agree that the little alarm which my remarks to "The Times" representative have evidently created will not do the gas industry any permanent harm. Candidly, I am strongly of opinion that the scheme for erecting super-electricity power stations requires careful watching, because past experience has proved that so-called "white elephants," no matter how large, can live to a good old age.

Albert Ball,
Chairman, Nottingham Corporation Gas Committee.

Nottingham, Feb. 8, 1919.

Miners: A Suggestion.

Sir,—The stocks of fuel in gas-works at present appear to vary from one week's to one month's requirements. The miners are apparently making preparations, by stopping work, for impossible terms in wages and hours to entirely suspend further supplies regardless of consequences.

My suggestion, therefore, is that the National Gas Council should at once apply for powers, to all gas undertakings, as soon as the miners hand in notices to stop work, to cut off the supply of gas from every house in which a miner is known to reside. This would directly bring home to the miner the inconvenience which he proposes to inflict on the general public, and also conserve stocks of fuel.

The offer made by the Government to the miner seems to err not on the side of justice but of generosity, and as usual at the expense of a long-suffering public—especially the middle class.

From personal experience, I say the miner's work is now-a-days very comfortable. It is only semi-skilled, and really very well paid at present; and, with ordinary care on the part of the miner himself, it is no more dangerous than that of (say) the railway or iron worker. As for comfort, he is not exposed to variations of weather or temperature as is the agricultural worker, or was the gas worker; and the air in which he works is now about as good as that above ground.

Ell.

Feb. 14, 1919.

Life of Retorts.

Sir,—In your issue of the 4th inst., you give an article by Dr. R. Geipert, an Engineer once on the Berlin staff of the Imperial Continental Gas Association, recording the work accomplished with six paired settings, each of twelve intermittent vertical retorts, which have been working for upwards of 3000 days. He also gives a full account of how these retorts have been carefully and properly looked after by the officials, and which no doubt has materially added to their long life. But, in my opinion, this information may be very misleading unless we are furnished with the amount of real work that has been accomplished by these retorts during their lifetime; and it would be of advantage if we knew the kind and tonnage of coals carbonized, the make of gas per ton, the total make of gas per retort, and the temperatures at which they were operated during their lifetime.

This question of the life of retorts and other fire materials is a very complex one, in which many factors have to be taken into the calculation; and I consider the actual time that retorts are in a setting is not by itself a just criterion of their true value. It is, I consider, necessary before assessing their real commercial value that you must judge their life more by the total volume of gas produced and the labour saved by working at the high temperatures now generally in operation in all works during their lifetime. I know of both horizontal and vertical retorts (made with the same kind of material) that have been in the settings both for long and short periods; and that in several cases the shorter lives of working have turned out the most profitable when all points have been carefully taken into consideration.

It has been thought by some that German fire goods were better than British make. But from experience some of us have known that this is not the case; and, like a good many other ideas prevalent before the war, this fallacy during the war has been completely exploded—especially in connection with the large carbonizing plant and steel works. A great number of these were built in pre-war times with German materials, and after the war commenced they could not be obtained, so the builders at once set to work to examine the British-made goods by scientific experts. Both the materials when analyzed, and their durability as tested, have proved superior to the German-made goods, as formerly supplied; and the Government officials who have been particularly engaged during the war with carbonizing plants and steel works are in full possession of the facts that the British fire materials now being used are superior to those formerly coming from Germany.

Undoubtedly, the best fire-materials turn out the most profitable to the users; and manufacturers generally are giving considerable attention to quality in this important matter. I also know that the Refractory Materials Research Committee in connection with the Gas Institution have done, and are doing, most excellent work in scientifically investigating all points in connection with this very important and rather complex part of our industry.

John West.

Southport, Feb. 14, 1919.

Industrial Unrest: A National Propaganda Needed.

Sir,—The reasonable aspirations of labour merit encouragement; but its present attitude can command neither sympathy nor support. We are just emerging from the most terrible conflict known to the world. To recover from its havoc requires unity—untiring industry from the whole community. Yet it is this partieular crisis that large sections of industrial workers have selected for pressing inordinate demands for increased wages and shorter hours—demands that, if granted and continued, can only involve national ruin in the near future.

Dislocation of industry for military purposes and difficulties of transport have, it is true, greatly increased the cost of living during the war; but this increase has not affected the industrial classes alone—it is common to all. There are to-day thousands of professional and middle-class citizens, investors living on their savings, annuitants, and others with financial responsibilities which they are quite unable to control, compelled to live on infinitely less than the present income of artizans, whose expenses, owing to their different social and domestic environment, need not approach one half of the expenditure of the class referred to.

The industrial workers' idea of a remedy for the higher cost of living, which he does not hesitate by strikes and strike threats to put into operation, is a demand for equivalent wages to meet it. The unfortunates of different social position are unable to apply such a remedy, and, in fact, have often to meet the situation as best they can on a materially reduced income. The particular war reasons for higher prices of commodities are being rapidly adjusted—workers are being demobilized and transport freed as speedily as practicable—and, given a few months' time, the natural result of a substantial reduction in prices, to the benefit of all, should accrue. The wage and other demands of the industrial worker not only prevent any diminution of prices, but actually increase them, and will continue to do so *ad infinitum*. It may be argued by the industrial worker that this need not concern him so long as he is able to make it good by further equivalent demands. But, apart from any question of consideration for his fellow citizens, it can be shown that the industrial worker is concerned, and very seriously, as he will speedily discover.

Let it be understood, once for all, that, with the coming of peace, the competition engendered by the effort to replace financial and commercial losses in all the great countries of the world will be of the most severe character, and that the only possible chance we have of maintaining our position is by Capital and Labour co-operating to increase production and stimulate trade—not by making less, but by working harder; not by killing and crippling industries by absurd demands for higher wages and unreasonably few working hours, but by a mutual endeavour to unravel the problem and to work together for the country's benefit. The inevitable alternative is class hatred, unemployment, our commerce absorbed by rival and more sensible nations, and financial disaster.

Of what moment against such an outlook is the gain of an additional, and, in many cases, an unnecessary, increase of wages? Let the British workman dismiss this insanity which threatens to sap the stability of our industrial life, and get to work to keep together the British Empire, for which so many of his fellows have recently suffered and laid down their lives. The industrial classes at the present moment are obviously profoundly ignorant of these realities of the situation; and it is to make them clear that a national propaganda is required. Use should be made of every available method of education, by addresses from competent speakers, and by apposite and striking leaflets and posters. The organization of the War Savings Associations, which did such excellent work during the war, might perhaps be utilized, with advantage, for this urgent and vital matter. Action is imperatively necessary.

H. Reginald Sibson, F.S.A.A., F.C.I.S.

Hove, Sussex, Feb. 13, 1919.

First Settle the Hours, and then the Pay.

Sir,—If the Government are to fix the maximum number of hours per working week, surely this should be decided before the question of wages is settled, either by agreement or before an arbitrator.

In common fairness to the employer, it is to be hoped that this course will be followed; otherwise he will be in the position of a man having to buy a poke at a fixed price without knowing how many (if any) pigs there are in it.

Edward Bruce Read.

Temple Chambers, Temple Avenue, E.C.,
Feb. 11, 1919.

REGISTER OF PATENTS.

Protection of Iron and Steel Surfaces.—No. 121,781.

PARKINSON STOVE COMPANY, LTD., and THOMPSON, J. A., of Birmingham.

No. 19,057; Dec. 24, 1917.

This invention relates to the rendering of iron nnd steel surfaces rust-proof by producing a coating of oxide on them; and it more particularly refers to producing the protective coating by heating the articles in the chamber of a gas-furnace by producer or furnace gases, and subjecting them to the action of superheated steam, thereby producing a coating of magnetic oxide. The principal object of the invention is to ensure that the steam shall come into contact with the articles at the temperature of the heating chamber, and therefore of the articles being heated, which allows of all kinds of ferrous metals being treated without variation of the process. The steam is admitted by a horizontal pipe above the heating chamber and having depending pipes or branches entering the treating chamber. The steam may conveniently be generated by a small boiler carried outside the furnace and heated by a gas-burner.

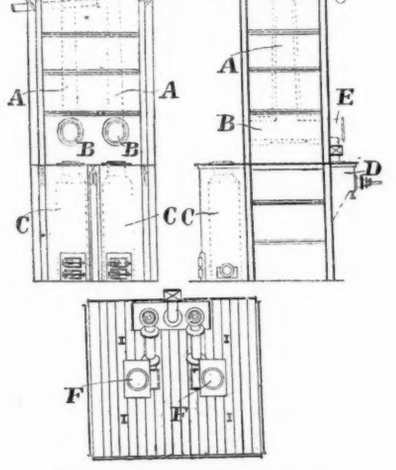
Retorts and Apparatus for the Manufacture of Gases.—No. 121,975.

DRAKES, LTD., and DRAKE, J. W., of Ovenden, Halifax.

No. 14,317; Oct. 4, 1917.

This invention relates to retorts and apparatus in connection therewith for use in the manufacture of varied gases—that is, coal gas, water gas, or producer gas, or for the manufacture of a combination of any two or three of these gases. The arrangement is of such a character that the continuous production of one or other or of all three gases and their mixing within the retort or retort-setting can be effected and changed or altered at any time to carry out any one of the processes, or to vary the relative proportions in the mixture of gases as occasion may require without interfering with the continuity of production of any one or other of the gases that are desired to be produced.

The illustration comprises a front elevation of the apparatus in accordance with one arrangement of the invention; a plan; and a side elevation.



Drake's Combined Gas-Making Plant.

Vertical retorts A are placed in settings above horizontal retorts B, which latter extend across the bases of the vertical retorts, which are open at their lower ends into the horizontal retorts. The settings in which the vertical retorts are placed form combustion chambers, with arrangements for the secondary air supply through the inlets found most advantageous, or without any secondary air supply under the conditions explained. Regenerative flues for the secondary air are arranged at the rear of the producers C below the horizontal retorts, so that when secondary air is to be used for the combustion of the producer gas this may be at any time carried out by admitting the entrance of air to the flues.

The producers are at a lower level than the horizontal retorts, and in all cases the producers are never less than two in number. Each of the producers is arranged so that the gases rising from it will first travel through a passage or flue to encounter a baffle that will deflect the dust or ashes carried by the gases and make them descend to a place where they may be of easy access for removal. The passage is continued in a vertical direction so that it may be divided into two parts, both of which are intercepted by a damper of a duplex character and of such shape that it may alternately cover one of the two passages. The gases pass into a chamber D, from which a pipe leads to the outer end E of one of the horizontal retorts, and thence through a valve into the retort and forward through it into one of the vertical retorts. Leading from the chamber D are also another similar pipe and valve, to conduct gases to the other vertical and horizontal retorts.

When manufacturing coal gas, coal is fed through the hoppers F to the vertical retorts, and is there distilled by utilizing the producer gas and secondary air, at which time the duplex dampers referred to will be opened for the producer gas to travel to the combustion chamber, and will be prevented from travelling to the chamber D. And this manufacture of coal gas may continue as long as desired.

When it is desired to manufacture water gas, the vertical retorts are filled with coke, the temperature of which may be raised by the combustion of the producer gas being consumed on passing through one of the chambers; while through the other producer, steam will be caused to pass through the producer into the chamber D, and forward into one of the horizontal retorts, from which it will pass through the vertical retorts.

When it is desired to manufacture producer gas alone, the producers may be used, and the retorts be entirely put out of action.

In carrying out the manufacture of mixtures of gases, the producers are so arranged that the products therefrom are conducted at one time through a passage leading to the combustion chamber surrounding the retort, while at another time they are conducted through another passage to flow into the interior of the retort. Consequently, the products from each might be conducted through one passage to the interior of the retort at one time, and through another and separate passage (each with a controlling valve) to the combustion chamber at another time. This would enable the actions of "blowing" and "running" to be alternately carried out.

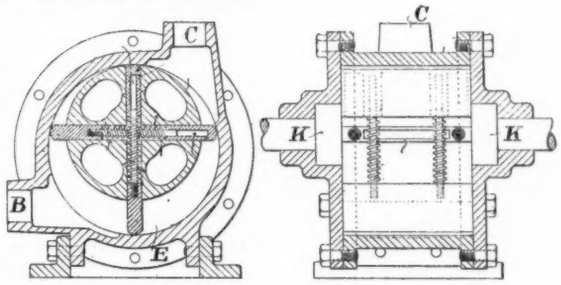
Rotary Pumps and Exhausters.—No. 121,985.

FLETCHER, RUSSELL, & CO., LTD., SINGLETON, J. H., and YOUNG, C., of Warrington.

No. 17,837; Dec. 3, 1917.

This invention—relating to rotary engines, pumps, blowers, exhausters, and the like—has special reference to crescent-shaped chamber types of such plant wherein pairs of diametrically-opposite spring-pressed sliding vanes work radially in an eccentric drum rotating in contact with one side of its casing. The object of the invention is "to provide an improved arrangement of the sliding vanes when four or a greater even number are employed, which will enable the use of longer springs for pressing the vanes outwards, and entail less compression of the springs when the vanes move inwards."

The illustrations show an irregular transverse section of the apparatus and a longitudinal section.



Singleton and Young's (Fletcher, Russell, & Co.) Rotary Exhausters.

The inlet is at B, with C the discharge outlet. The rotary drum is eccentrically mounted in the casing, and forms therewith the crescent-shaped chamber E, fitted with two pairs of diametrically opposite sliding vanes, operating in slots which extend completely across the drum at right angles to each other. The four sections into which the drum is thus divided are connected by the end discs or flanges K, cast in one with the sections and the central shaft M. The vanes have secured to them guide-rods adapted to slide freely in holes in their complementary vanes, and on the rods are mounted springs which press the vanes apart and outwards. One set of rods is spaced longitudinally to clear the other set; and holes are provided in the vanes to release the air as the vanes move inwards.

According to a modification, separate slots, which (as usual) do not extend completely through the drum, may be provided for the vanes, and holes may be formed in the intervening material between opposite slots for the passage of the guide-rods and springs.

Manufacture of Combustible Gases.—No. 122,079.

PICKARD, W., of Rochdale, and DOBSON, D. R., of Bolton.

No. 4589; March 15, 1918.

According to this invention, crude hydrocarbons and acidulated water are heated in a retort, and the mixed vapours are passed through a mass of iron filings to ensure mixing and to stop the passage of any unvaporized material. The resultant mixed vapours are heated together and then passed through or over a bed of glowing charcoal and iron filings, which decomposes the vapours or reduces the hydrocarbon vapour so that a permanent gas is produced.

Mixing Air with Gas for Motor-Cars.—No. 122,004.

FLUGEL, B. J. V. A., and WEBB, H. F., of Green Lanes, London, N.

No. 301; Jan. 5, 1918.

This invention is especially applicable for use on motor-cars having internal combustion engines in which coal gas is used for producing the explosive mixture.

The patentees' claim is for a carburettor in which the combustible

fuel is fed into the mixing chamber in an annular cone-shaped film or stream (or equivalent annular series of streams) through an inlet so located on the longitudinal axis of the chamber as to cause the film or stream not only to flow counter to a stream of air flowing in at the end of the chamber, but also to strike the stream or streams of inflowing air at points where these have already expanded.

Proportioning Combustible Gaseous Mixtures.

No. 122,215.

IONIDES, A. C., JUN., of Porchester Terrace, W.

No. 18,508; Dec. 13, 1917.

This invention relates to means for ascertaining, adjusting, or otherwise determining, the proportions of the constituents in a gaseons mixture of a combustible and a supporter of combustion, "combined prior to ignition in such proportions that combustion in a confined chamber to a desired limit may be effected without a furthur supply of air."

The patentee claims to have found that, although mixtures of ordinary coal gas and air, when issuing under moderate pressure—say, 1½-in. water-gauge—into the atmosphere from a small parallel orifice or jet, will not continue to burn when the proportion of air to gas appreciably exceeds three to one, yet, by suitably flaring or coning the mouth of an orifice formed of bad heat-conducting material, or by heating the mixture to a suitable extent, combustion on issue will easily continue with mixtures up to (or exceeding) seven of air to one of gas—varying with the quality of the gas. In connection with experiments of this kind on differently proportioned constant mixtures, he makes the following observations. "A mixture of one-and-a-half of air to one of an ordinary London coal gas gave, under the above conditions, a long flame having a central extended cone of greenish colour of a clearly defined length, which cone shortened as the proportion of air in the mixture was increased, until it became a minimum which, in this case, was half of the length first observed. The proportions of air to gas at this point were three-and-a-half to one.

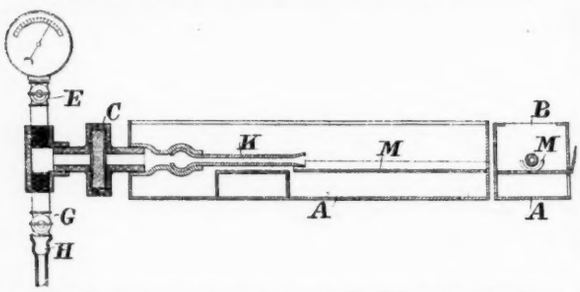
"The central greenish cone up to this point had been surmounted by a sheath of reddish-yellow colour of a maximum diameter at about the middle of its length, which gradually decreased in thickness and length until, at a ratio roughly of three-and-three-quarters of air to one of gas, the outline of the cone and the exterior of the sheath merged into the single outline of a flame of a faint blue colour and gradually tapering form, slightly longer than the above minimum cone.

"Continuing to increase the quantity of air in the mixture, the characteristic of a single outline bluish flame was maintained—increasing in length until, at seven parts of air to one of gas, the flame was double its minimum length.

"Proceeding again in the reverse direction, by reducing the proportion of air in the mixture, it was noted that the definite reappearance of a distinct sheath and greenish yellow cone in the flame coincided with the proportion of about four of air to one of gas. It was thus evident that the alteration in the character of the flame and its minimum length coincided with proportions of gas and air which gave a neutral mixture for the gas under consideration, corresponding to maximum efficiency combustion in a closed furnace, and that the relative lengths of the cone and flame also indicated further defined proportions in either an oxidizing or in a reducing mixture. The measurements of cone and flame lengths vary with the quality of the gas and the pressure of the incoming mixture."

The present invention consists, broadly, in applying the foregoing phenomena to the determination of the proportions of the constituents in a gaseous mixture of a combustible and a supporter of combustion.

The illustration shows in longitudinal and cross section, a portable form of apparatus for operating in accordance with the invention.



Ionides' Apparatus for Proportioning Combustible Gaseous Mixtures.

The trough or casing A (of metal or other suitable material) has the greater portion of its top open, as shown at B. Into one end of the casing is fastened a back-flash extinguishing device C [see patent No. 12,346 of 1912], its outer end attached to stop cocks E and G, the former surmounted by a pressure gauge, and the latter provided with an extension to receive a rubber tube connection H. The end of the back-flash extinguisher projecting within the casing is provided with a rubber tube, into which is inserted the bulbed end of a silica glass tube K, the other end of which is internally coned or flared. This tube may be about 3 in. long and ⅛ in. bore. Fastened to the opposite end of the casing, and projecting to beneath the end of the tube K, is a shallow trough or shield M, formed to a semicircle in cross-section. This screen is preferably darkened upon its upper surface (in order to render the flame more visible), its edge being provided with markings for determining the length of the flame.

When using the apparatus, the rubber tube H is connected to the outlet of the furnace or burner to be tested, or to the outlet of any appliance in which a mixture is formed from separate supplies of two constituents—such as gas and air—maintained at equal or constantly related moderate pressures. Further adjustment of the pressure at the jet and upon the pressure-gauge is effected by adjustment of the stop-cocks E G as desired—a pressure of a few tenths of an inch water-gauge being generally a convenient one with which to operate. The jet of issuing mixture is then lighted, and the proportions adjusted until the desired result is obtained by observation of the flame.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Feb. 12.]

Nos. 2599—3178.

BAINES, J. R.—"Device for repairing leakages in pipes and tubes." No. 2685.
BENNETT, J. F.—"Producer-gas generators." No. 2829.
BOUGHTON, H. F.—"Apparatus for washing gas." No. 2825.
CLARKE, F.—"Gas, &c., lighter." No. 3131.
DAVIS-BOURNONVILLE COMPANY.—"Gas-cutting apparatus." No. 3073.
EVERETT, S.—"Treatment of carbonaceous materials for manufacture of power gas with recovery of hydrocarbon oils." No. 2864.
FRICKER, A. E.—"Valves and cocks." No. 2620.
GAUNT, J. W.—"Gas or coke fired furnaces." No. 2778.
GILLOTT, W. M.—"Producer-gas generators." No. 2829.
HACK, T. H.—See Boughton. No. 2825.
HOLT, C. E.—"Method of manufacturing gas from coal, &c." No. 2706.
HORRIDGE, J. A.—"Bunsen burners." No. 2621.
LAWLEY, W. & J.—See Gaunt. No. 2778.
MARPLE, G. S.—See Gillott. No. 2829.
MUNGALL, J.—"Drilling and tapping machine." No. 2651.
RITCHIE, A.—See Mungall. No. 2651.
ROBERTSON, D.—"Pyrophoric gas-lighters." Nos. 2855, 2857.
SALERNI, P. M.—See Everett. No. 2864.
SOC. C. M. STEIN ET CIE.—"Coal distillation furnaces." No. 3128.
WALKER, T.—See Holt. No. 2706.
WARING, E. & W.—"Gas-producing and steam-raising combined with steel-melting furnaces, &c." No. 2997.
WILSON, A.—"Incandescent gas-lamp." No. 3015.
WITHERSPOON, C. J.—"Lighters for gas-lamps." No. 2792.

PARLIAMENTARY INTELLIGENCE.

PRIVATE BILL PROCEDURE—SESSION 1919.

HOUSE OF LORDS.

The following Bills will originate in the House of Lords: Hartlepool Gas and Water, Huddersfield Corporation Gas, Newark Gas, Pembroke Gas, Sheringham Gas and Water, Stockton-on-Tees Corporation, Stourport Gas, Sunderland Gas.

In all cases the Standing Orders have been complied with.

HOUSE OF COMMONS.

Petitions against Bills.

Petitions have been lodged against the Bournemouth Gas and Water Bill, by the Poole Harbour Commissioners, owners and occupiers of property in Poole, the Bournemouth Corporation, and the Poole Corporation; the Northampton Gas Bill, by the Grand Junction Canal Company of Proprietors; the Stocksbridge Gas Bill, by the Great Central Railway Company, the Sheffield Corporation, and the Sheffield Gas Company; and the Stretford Urban District Council Bill, by the Stretford Gas Company.

Brentford and South Shields Gas Bills.

The following notices of motion had been given for yesterday in the House of Commons: (1) "The Brentford Gas Bill to be deemed to have been read a first and second time, and (the Bill having been reported and considered in Session 1918 of Parliament) to be ordered to be read the third time." (2) "The South Shields Gas Bill to be deemed to have been read a first and second time, and (the Bill having been reported and considered in Session 1918 of Parliament) to be ordered to be read the third time."

Bills Read the First Time.

In the House of Commons on Friday, the following Bills were read the first time and ordered to be read a second time: Bournemouth Gas and Water Bill, Northampton Gas Bill, Stockbridge Gas Bill.

Bath and the Fuel and Lighting Order.—The Household Fuel and Lighting Order, restricting the use of gas, affected the sales of the Bath Gas Light and Coke Company during the past year; there having been a decrease of over 7 p.ct. in the gas consumption as compared with 1917. The Directors point out in their annual report that the advance in the cost of coal and other materials has continued, and rates of wages have further increased. There has been no alteration in the price of gas during the past year. It remains at 2s. 3d. per 1000 c.ft. The Directors, following their action of the previous year, have set aside a further sum of £10,000 to meet the cost of work on renewal of plant delayed on account of the war. An interim maximum dividend of 5 p.ct. per annum (less income-tax) was paid in August last for the half-year to June 30; and the Directors now recommend the declaration of a dividend at the same rate (less income-tax) for the six months to Dec. 31.

MISCELLANEOUS NEWS.

SOUTH METROPOLITAN GAS COMPANY.

The Ordinary Half-Yearly General Meeting of the Proprietors was held at the Cannon Street Hotel last Wednesday—Mr. CHARLES CARPENTER, D.Sc., in the chair.

The SECRETARY (Mr. F. M'Leod) read the advertisement convening the meeting, and the minutes of the last ordinary general meeting. The seal of the Company was then affixed to the "Register of Proprietors."

THE CHAIRMAN'S SPEECH.

The CHAIRMAN: Ladies and Gentlemen,—Presuming that you will, as usual, take the report and accounts as read, I have now to move their adoption. My task this afternoon is, however, a somewhat heavier one than this; and I must ask you to extend to me your usual kind indulgence in my endeavour to deal with it. If you look back to the various reports of the working for the last four years, beyond the bare record of the numbers of our officials and staff serving the country, you will find little (if any) reference to matters outside of what I may call the ordinary business of the Company; and if your patriotism did not prompt you to ask: "What have the Company done in the great war?" all the same, my colleagues and myself were bound to come before you this afternoon, to give you a full account of our stewardship.

THE COMPANY'S PART IN THE WAR.

For during a period of suspense and anxiety to the whole nation, we have never hesitated to sacrifice the interests of the Company, when those of the nation were at stake. For that reason, we occupy a special position in coming to you this afternoon. We have to tell you of the responsibilities we undertook, and of those we have incurred; and to ask your approval of the course we have followed. The reason why we have not spoken of these matters before is that, for one thing, it is generally better to talk of what you have done, rather than of what you are going to do; and there is the other practical reason that we did not want to offer any special inducement to the enemy to pay us unusual and undesirable attentions by his various forms of aircraft. It was not very long after the war broke out, that one of its immediate results began to be felt in a shortage of products required in the dye industry. These, as you know, owe their origin to the products produced in gas-works; and we lost no time in getting our chemical staff to work upon their manufacture. We were fortunate in obtaining an agreement with the firm which afterwards became the nucleus of British Dyes, Ltd., to manufacture for them intermediate products; but we had not proceeded very far, when a greater and more imperative national need arose. This was for high explosives, the most important of which originate in the bye-products from gas-works. I need not recapitulate to-day the terrible story of the shortage of high explosives in the late autumn of 1914 and the early spring of 1915, when, it has been stated, cigarettes were served out to our gallant soldiers because there were no shells to give them to fire at the enemy. We were asked to give our attention in that crisis to the production of materials required for the manufacture of these high explosives; and you will be pleased to be told that within two months we had a plant running turning out a first instalment of what was required. Our staff, already heavily depleted by the war, had, therefore, to put all their dye problems on one side; and from that date, outside the research laboratory, practically the whole of our attention was given to work in connection with the High Explosives Branch of the Ministry of Munitions. The result of the work is summed up in the report. Of the works therein referred to, the two largest were at our East Greenwich and Old Kent Road works respectively; and in that bare statement you have the reason why we were not anxious to draw particular attention during the past four-and-a-half years to our activities in this direction. As I have stated, we did not want to give the enemy an additional reason for paying us undesirable special attention by his aircraft or spies.

THE PRODUCTION OF TOLUENE.

Now, I must refer to the production of toluene, which forms the basis of the well-known "T.N.T." explosive. A serious shortage of this material occurred in 1916; and with the invaluable help of our tar products works, we submitted a scheme to the authorities for the rapid utilization of the whole of the gas-works of the country for its production. Within a very short time of that, the gas industry had completely organized itself for this purpose, with very little outside help; and one of the debts owed by the nation is certainly the one it owes to the gas industry for the magnificent response it made to the urgent appeal which was put forward. I am glad to have this opportunity—the first I have had—of paying tribute to the important part performed by our officials in formulating the practical and technincal details of the work required to carry out that scheme.

CHARCOAL FOR GAS MASKS.

One other matter in connection with this I ought to mention, and that is that practically the whole of the charcoal required for gas masks was made at our West Greenwich works, which were almost entirely given over to the late Colonel Harrison for this purpose.

A POISON PRODUCTS FACTORY.

There is still another fact I must mention in regard to what we undertook in respect to munitions of war. We were just ready at the poison products factory, when the armistice brought our operations to a standstill. I think it is only fair to say, still further, that the work we undertook was of a most dangerous character, owing to the high toxic nature of the compound we were making. The works were run entirely by volunteers, of whom we had more offers than were needed, from those who longed to take a hand in the process of paying back our enemies in their own coin.

INJURY BY AIRCRAFT.

Then I ought to tell you, with regard to injury to our plant by attacks from enemy aircraft, that only one of our gas-making stations was struck by a bomb; and the damage there was not at all serious. There was no injury to life or limb; and the damage was repaired within twenty-four hours. This was the whole of the damage done to the seven stations of the Company; but the immediate neighbourhood of the works suffered badly upon more than one occasion. It would almost look as if, in an aerial attack, the safest place was a gas-works, because the chance of hitting them seemed to be small, though the enemy got unpleasantly near. The worst disaster which befel us was the wrecking of our largest gasholder, and the loss thereby of 8,000,000 c.ft. of gas. This happened as the result of the Silvertown explosion, which at the same time injured another holder, and damaged a good deal of our chemical plant. Thanks to the presence of mind of a valve-man, no one was injured, though one man was struck by falling glass some distance away. There was also the striking fact that not a single consumer was inconvenienced in the slightest degree by the mishap. I think I may say that, apart from any consumers who happened to be passing at the time, none of them knew what had occurred. It is interesting to state that the holder in question was the special pride of the late Sir George Livesey. On occasions when I used to visit the works with him, if there was an opportunity, he used to walk round that way, and refer to the holder as practically the last word in gasholder construction. The repaired holder is not yet at work. Owing to the difficulty with regard to materials and labour, it has taken a long time to carry out the necessary repairs; but we are pleased to say that, within the next couple of months, we shall have the holder, if all goes well, at work again. I must, in connection with this, pay a tribute to the staff whose duty it is to maintain, under all circumstances, an adequate supply of gas. This holder represented a very large percentage of our total storage capacity; and I have more than once wondered how they managed to get along all this time without any mishap. The fact remains that they have; and it is only right that they should have credit for what has been a very difficult and uncertain task.

LOSS OF SHIPS AND MEN.

I must make one more reference to our war losses—and it is not the least important. Ten of our ships have gone to the bottom, with the loss of thirty-two lives, as the result of enemy action. I think I may say that we have been much more unfortunate proportionately than any other London Gas Company. One has lost not a single ship; while we have had the bad luck to lose ten, and the still worse luck to lose these valuable lives. I cannot pass over this without saying that no praise is too great for the captains and their crews, who have so bravely carried on throughout, despite the horrors added by the enemy to the perils of the sea. [Applause.] I am also glad to tell you that, though some of them have had their ships twice torpedoed under them, they are still sailing under the Company's flag, though of our fine fleet only four remain. The shipping problem is a very difficult one just now; but we have placed orders for four more vessels, which will bring us up to eight. We shall also take favourable opportunities of placing orders for others. We are between two difficulties. The cost of ships is very high, and the cost of freight is very high too. We want to hit a medium line in between.

WHAT THE EMPLOYEES HAVE DONE.

Now I must make some reference to our employees. I do not think any apology is necessary on the part of anyone connected with the gas industry for referring, even at length, to the question of labour. As regards our employees, I may say that for them the war began on the Sunday before hostilities were declared. That morning, I went to the headquarters of the St. Johns Ambulance, and said good-bye to a contingent of the men who had been mobilized for war purposes. I have every reason to believe their services were of very great value. Within a week of that time, the Company's co-partners had organized for bearing their share in coping with the immense problem with which the nation was confronted; and they did it by starting a war fund to which all officials and employees were invited to contribute, having for its object relief from financial anxiety in respect of wives, children, and dependants of those who were daily leaving for the front. The administration of this fund has been wholly in the hands of a Committee of Employees under the chairmanship of Mr. Beard, to whom the thanks of all interested are due. Many letters have been received expressing the gratitude felt by the absent fighters for the aid thus provided. The Company, on their part, did everything possible to make enlistment easy to those desiring to serve. In pursuance of this policy, permanent notices were prepared and affixed to the various works and depôts, stating that only temporary employment or promotions would be made during the war, and that on its termination all claims for advancement in positions would be considered in conjunction with the applicants' records of what they had done to help their country during her hour of trial. It was thus possible for all who joined up to do so without anxiety as to the welfare of their dependants or their prospects of advancement being prejudiced during absence. In short, while the Company did not in any way usurp the functions of a recruiting sergeant, they put not the slightest obstacle in the way of anyone volunteering to defend his country—whether (to give two extreme cases) it was the office boy or the resident engineer of our largest works. To complete this portion of my story, I must add that the employees' war fund has now reached a total of £123,460, every penny of which has been wisely and carefully expended by an indefatigable Committee. [Applause.] But, you will say, "In what way does what you have told us differ from what may be said of other similarly placed organizations?" The key enabling the answer to be given to this. is not included in the half-yearly report, wherein, as you know, are recorded the numbers of those who served, and the proportions of fallen and wounded. I give you the key here in the bald statement that before the war we had 6200 workmen and 400 officials, or a total of 6600; and if you compare these figures with those appearing in the report, you will see that we contributed to the country's defence a contingent numbering considerably more than one-half of our pre-war staff. I have not seen these figures approached in the case of other undertakings that have published them; and, in connection

with this, I would also ask you to remember that we had, for the first half of last year—before we were restricted as regards output by the Coal Controller's regulations—the largest output in the history of the Company.

THE PART PLAYED BY FEMALE WORKERS.

The last matter of this kind to which I must refer is the dilution of labour by female workers. Without this, we should never have been able to follow the policy to which I have been drawing your attention this afternoon. You heard during the war a good deal about indispensable labour. Apart from very necessary skilled superintendence and workers, our real indispensables have been the women. No job was too hard for them to tackle. As gas-stokers, they proved as good as men, though a lower standard per head—namely, two-thirds—has been taken as their basis of output and of their rate of pay, both in strict proportion. Their spirit has been admirable; and the help they have given us invaluable. Such, ladies and gentlemen, is the story of how this Company "did its bit" in the great war.

CO-PARTNERSHIP AND TRADE UNIONISM.

But the work, let me tell you, would never have been accomplished, had we not been a co-partnership undertaking. [Applause.] Our men cordially welcomed the dilutees, and loyally assisted them and the women in acquiring the requisite knowledge of their duties—knowing that, in so doing, they were following the dictates of true patriotism. Trade unionism has either been betrayed or has betrayed itself during the great war. It had magnificent opportunities to prove its value. By its results, not by its ideals, we must judge it, if it has proved wanting. I must give you some examples from my own knowledge. For a whole year, the Union fought against the war-time proposition of the employment of women in retort-houses. If they had had their own way, not one would have been working in them. They sent a deputation of unbelievers to one of the Company's works to see for themselves; and they had to admit, against their will, that the work was being done, and well done. They went away and held a Committee meeting, to decide what the course of action should be. The Committee determined to continue their resistance; but they excluded from their deliberations the very women representative unionists by whom they had been accompanied in their investigations, and who had expressed themselves as perfectly satisfied with the conditions under which female labour was employed. Here was no question of an eight-hour day with meal-time allowances. They had it. Or of wages; for they had these. The Union were simply protecting their members from being called upon to take their share in defending the country. The only approach to a difficulty that we ourselves have had, has been in connection with the instruction of some co-partners crippled in the war, whom it was desired to equip with the means of earning their livelihood. It is not the easiest thing in the world to find suitable work for an intelligent able-bodied man who has lost a leg; but the task of meter-repairing affords this opportunity, as it is mostly sedentary—that is, it can be carried on like a watchmaker's work, seated before a bench. We got volunteers to undertake this teaching in a separate workshop. Then the Union intervened; and I was told that, rather than that they should be taught a trade, the crippled soldiers should be maintained by the State, and in idleness if necessary. We paid the full rates for their labour; and I promised that these should always be maintained, and that we would not displace by them a single employee. But, in spite of all this, some of the men left, saying they did it with regret, but they had to obey their Executive. They were not out of pocket by their action, as they were taken on in a national factory, and received the nation's pay. We are getting on quite well without them.

THE CLEANING OF COAL.

We have had very great difficulties with regard to the dirt and foreign matter in the coal. This arises from the fact that, owing to shortage of labour, the coal has not been properly cleaned. It is the easiest task in the world to clean coal. It is shot on to a canvas belt as it comes from the pit, and at the end of the belt the coal falls into a hopper. On either side of the belt as it travels are usually persons who pick out the rubbish, &c., and drop it underneath, so that by the time the coal gets from one end to the other, it is cleaned. It is just the sort of job that a woman could undertake, having regard to the great importance—especially when shipping was so short—of carrying, not coal and dirt, but coal. The Union would not, however, allow women to be employed in this way.

THE CASE OF AN AIRCRAFT DEPÔT.

The last case I must mention is one in which some of our men nearly caused a strike in a large Government aircraft depôt, under construction, and urgently required for the prosecution of the war. The matter was considered so serious that I was called in to investigate it on the spot. It appears that our men, who were carrying out the gas-fitting at the depôt, while they belonged to a Union, were not members of the right one in the eyes of the other workers there. These threatened to strike unless our men joined their particular Union also. The Government official in charge of the works offered to pay the cost of their doing so—whether out of the pocket of the State or his own, was not mentioned. Our men considered this proposal, but did not look upon it as exactly "cricket;" and as things were being made pretty hot for them, they nearly decided to give up the job. I said, "If you do that, you will be putting the Company in the wrong by making them break their gas-fitting contract; but it will not be our fault if they strike against you." I asked the manager of the depôt, "What will happen if your men strike?" He replied, "I shall have to put Union labour on to the work; and it will take ten times as long, and cost ten times as much." "Look round," said he, "in this building. There are only a couple of workmen doing a stroke of work. I came from Canada to help in the war; but I shall be glad when I get back, for whether we win the war or not does not matter with labour in its war-time attitude." I felt called upon to make these references, because we have said in times gone by how much co-partnership has done. It has been tried and tested by the war, and has come out triumphant.

THE BUSINESS OF THE HALF YEAR.

I must now deal with the more ordinary features of the report. As you have noticed, we did not make both ends meet during the last six months, though our price of gas was double the pre-war figure. We cannot expect to run such a business as ours economically with a 12 p.ct. reduction in output. This will, no doubt, correct itself as the gas-using restrictions are removed. But the cost of coal and labour has risen to a figure alarming in the extreme. The reduction of output in its industries is one of the most serious of the post-war problems with which the country is faced. Our hopes for our own particular industry are based upon the fact that a general solution must in some way or another be found by the responsible Government, or the nation as a whole will undoubtedly go-under before the competition of other countries which it will have to meet. This Company have always looked with favour upon proposals for reasonable reductions in working hours; and, personally, I should be the last to regard unsympathetically the attitude of the worker who, commencing at (say) eight in the morning, thinks at about five at night he might be commencing his homeward journey.

AN ELECTRICAL PICTURE.

Now, in speaking of the gas industry, I must refer to another subject in which it is deeply interested—namely, the picturing of a land overflowing with electric energy, produced from a few super-stations. Gas has struggled along unaided by the State for more than a century; and if the Government seriously consider devoting public money to the improvement of the supply of electric energy, it is not less necessary that they should equally foster and encourage the manufacture and distribution of gas. ["Hear, hear."] For it must not be forgotten that, after all, gas does utilize the coal resources of the country to better advantage than can be promised by the advocates of the electric super-station. Gas at the present time utilizes the heat energy of the coal to a very much larger extent than electricity does, or than the electricians, even in their most optimistic speeches, can hold out a prospect of. And the resources of gas manufacture are not by any means exhausted. We have not yet put up our final ideal station. We have not said the last word we have to say, or anything like it, with regard to the economical production of gas from coal. Another thing, it must not be overlooked that the electric train or tram would carry ill-equipped workers to their labours, if they were not first fortified by the punctual breakfast that the gas-cooker ensures.

HEAT UNITS INSTEAD OF CUBIC FEET.

But for the purpose of maintaining the portion of industry which it is the particular function of the gas undertakings to provide, it is essential that that industry should also take to heart some of the lessons of the war, and (as all other industries are doing to a greater or less degree) put its house in order, because gas at so much per 1000 c.ft. may to-day mean anything. The supply of one undertaking may differ from that of another by as much as 25 p.ct. in its heating value. In other words, gas at 3s. 6d. per 1000 c.ft. may be more costly to the consumer than that supplied by another undertaking at 4s. Parliament must prescribe a new basis of gas charges—namely, one based on heat, instead of volume. The consumer would then know exactly what heat energy he is paying for. He would buy so many heat units, instead of so many cubic feet of gas; and he would then be in a position to make true comparisons as regards cost. It would be necessary at the same time to devise machinery by which he would be assured of getting the units he pays for, and as many as he needs. A Government which carries out a programme of this character will deserve not less gratitude from the nation than they can hope to get for electric super-stations; and gas undertakings will obtain an incentive to improve results by the application of science to their industry, the possibilities of which are exceedingly great. The problem of the quality of the gas supply of the future is not an easy one to solve; for this not only depends upon the generation of gaseous heat units most economically, but also upon their purification and distribution to the consumer. To give only one example, which will bring this home to everybody. If you have a gasholder, constructed to store the heat units contained in gas to the value of (say) 600 B.Th.U. per cubic foot, it is obvious the thermal storage of this holder will only be two-thirds as much if you store, instead of 600 B.Th.U. gas, 400 B.Th.U. gas. So you see, the problem is not so simple as may appear at first sight. It is not merely one of generating heat units in the most economical manner. The plant that a gas undertaking requires is not only for the generation of heat units, but also for purification, &c.; and then you have to store the heat units and distribute them. You have to see that the right number of heat units get to the consumer. All these factors have to come into the calculation, before you are in a position to decide what value of gas it is most economical for you to manufacture.

DISTRIBUTING THE BENZOL IN THE GAS.

The paragraph of the report relating to the policy of distributing through the mains and pipes the benzol contained in purified gas, is well worthy of careful consideration, having regard to the magnitude of the figures involved, and the importance of considering the whole problem of gas supply together. In arriving at a solution, it is highly necessary to take into consideration local circumstances. For instance, while it might be economical in one district to convert a large proportion of the residual coke into gas, in another it might pay better to use nothing but coal for the production of the heat units required. But all these extremes of practice must, again, be dealt with having the fullest regard to the interests of the consumers. Then there is another fact which is often overlooked, and this is that to-day immense numbers of flat-flame burners are still in use—many of them in positions where neither the incandescent gas-burner nor the electric bulb would form an alternative method of lighting. The extra consumption of de-benzolized gas under these conditions is not a mere question of 5 or 10 p.ct.; it might be 200 or 300 p.ct. We must also thoroughly satisfy the consumer that he is not prejudiced by any change, whatever it may be; and we must also satisfy ourselves that we are not foolishly relinquishing a valuable weapon from our armoury, when we give up, or seriously reduce, the self-lighting power of our present gas supply.

REMUNERATION OF CAPITAL EMPLOYED IN GAS UNDERTAKINGS.

The last matter to which I have to refer is the very important subject of the remuneration of capital employed in gas undertakings. No one

can suggest that for post-war conditions the payment of a 3 p.ct. dividend upon capital employed in industry is other than unfair and inequitable. I am not without hope of being able to submit to you—I trust before very long—proposals for a new basis of working which, while safeguarding the interests of the consumers (who are too often forgotten nowadays), will at the same time take count of the fact that the labourer and the shareholder—the other partners in the business of gas supply—have claim for substantial incentives to give their best by way of efficient and economical production. In conclusion, let me say I think you will now understand what was in my mind when, at the outset, I stated that my colleagues and I came before you in a special sense to-day to ask your approval of our policy; and if our attitude as regards the war has resulted in pecuniary loss, we have not attempted, on the other hand, to take advantage of it to unfairly inflate our profits. In this course I am fully convinced we shall have the support of the great bulk of the public upon whose favour our future progress so greatly depends. I now move—

"That the report and accounts be received, adopted, and entered on the minutes."

THE WORK OF THE CHAIRMAN.

The DEPUTY-CHAIRMAN (Mr. F. H. Jones) remarked that the duty of seconding the adoption of the report and accounts generally fell to the Deputy-Chairman; and it was not his custom to do more than formally second it. That day, however, the Chairman had told them of many things that the Company had done; but he had not told them what the Chairman had done. He (the speaker) would not be doing either the Chairman or the Company justice unless he told them just one or two things their Chairman had done. He had worked very largely for the Government on outside work—though how he had found the time, it was difficult to say. He had not, when referring to the shortage of toluene, told them that most of the gas-works up and down the country were equipped with a plant hurriedly got together, by which, with the help of the staff of the Company, the industry had been put in a position to provide the toluene. This process developed afterwards; but in the hour of emergency, it was their Chairman and Company who had shown the way. He had not told them that it was entirely due to his own driving power and force of character that women had been introduced into the works, without which step they could not have gone on. He had not told them that companies up and down the country had had to come to the South Metropolitan works for women to go and teach others the work. He had not told them of the terrible times that he and the Board had had to go through when their biggest gasholder met with disaster. The East Greenwich works suffered, and felt it; but their Chairman felt it most. He had not told them what he went through when ship after ship and life after life were lost. The brunt of all this fell upon the Chairman; and it was right that the proprietors and the public should know about it. The Chairman had once been accused in that room of being too enthusiastic. His enthusiasm had been worth a great deal—not only to the Company but to the nation. He (Mr. Jones) only wished that he was at liberty to read a letter of which the Chairman and those people who had been allowed to see it were very proud.

PROPRIETORS' VIEWS.

Mr. WEST said he had to thank the Chairman for his interesting *résumé* of the work done by the Company during the last four years. From the point of view of the proprietors, however, it was a very serious matter that the dividend should have come down from £5 9s. 4d. to 3 p.ct. Their Company were losers, and not like other industrial concerns who were making enormous profits.

Mr. PRICE asked whether the Directors were making any arrangements, or creating any fund, by which to liquidate the redeemable debentures and preference stock when they became due. They had heard what the Chairman had to say on the balance-sheet; and he thought they should be very much obliged to him for the lucid way in which he had put matters before them. What had been accomplished by the Company was a thing for the whole of the Directors to be very proud about. Approaching the balance-sheet, the three things that interested them most were the financial position, the dividend that was going to be paid, and the valuation of their stock in the market. There had been £750,000 of capital put in front of their capital. Interest on this and on the bank loans had amounted to about £25,000. Temporary loans had gone up to £295,000. He, the speaker, was sure the proprietors would have agreed to have taken a lower dividend in the first half of 1915.

The CHAIRMAN: I have not much to say in reply to the shareholder who has just spoken. He has not really offered one serious criticism. He has not shown in one single respect where we have failed to do a duty which we should have done. The only suggestion he does make is that two or three years ago we should have said to the shareholders: "Do not take so much of your dividend out, because you may want it in the future." That is a policy which everybody is quite competent to carry out for himself. People can either use the dividend they draw to-day, or put it on one side for future use. That is not our business at all. We are not prophets. All we can do is to tell you as accurately as we can what are the near prospects of our business. We cannot tell you what position the business will be in in two or three years' time. With regard to the preference stock, we have power to redeem it. When the time comes we shall have to consider whether to issue fresh stock to take the place of the temporary preference stock, or whether we shall issue stock of other denomination. The speaker seems to forget we have been at war, and the great changes that have taken place in the cost of raw material and labour. If he is anything of a business man, he must know that the capital required is one thing when your raw material is 15s. per ton, and another thing altogether when the raw material is 38s. per ton. That is the position to-day; and it is as plain as a pikestaff to any man who possesses the rudiments of business knowledge. We all regret that we have not got more dividend; but it is certainly not the Company's fault. To go to the root of the thing, it is probably the Kaiser's fault for going to war. What we are doing is to carefully conserve our business. We are carefully watching it; and building it up, not only with regard to the present, but the future. We are not sacrificing present-day efficiency to future possibilities; but we are doing all we can to maintain it, not only for to-day, but we believe for a very long future, as an essential business for the whole community. With regard to coal by rail and coal by sea, we have, as a matter of fact, been getting a considerable portion of our coal by rail; and, in comparison with the freights ruling, it is from 2s. to 3s. per ton cheaper. At the present time, nearly the whole of it is coming by sea. As regards the policy of the Board, it has been, as far as possible, to conserve the interests of the Company, while at the same time remembering that it is the public after all to whom we have to look for our prosperity. We have not attempted to snatch any advantage in the present, because we know in this respect we are different from many other industrial organizations. We have got to live with our customers. We are in South London for all time; and our customers for all time will be the South London residents. We do not forget this in settling our policy. I think, on the whole, we may say that this policy has met with the approval of the people whom we serve. And now, I must refer to one other matter. The Deputy-Chairman has been giving you a picture of the duties falling upon me by reason of the war. But he himself would have done just the same in my place. I do not deny that I have worked as hard as possible; but it is really the staff who deserve the credit for all these things. The unselfish manner in which the staff have worked, week in and week out, with the one end before them—to win the war—calls for unstinted praise.

The motion for the adoption of the report was then put to the meeting, and carried unanimously.

THE DIVIDEND.

The CHAIRMAN: I have now to move—

"That dividends as follows for the half year ended Dec. 31 last be now declared—viz., on the 5 p.ct. redeemable preference stock at the rate of 5 p.ct. per annum: on the ordinary stock at the rate of 3 p.ct. per annum; and that the warrants be transmitted to the registered addresses of the proprietors by post."

Mr. E. HONORATUS LLOYD, K.C., in seconding, said he did so with pleasure, though he had to confess that his pleasure would have been greater if the dividend on the ordinary stock could have been higher. It was not higher because Parliament had said it should not be. The sliding-scale was temporarily suspended; and the Company were permitted by Parliament to pay that which the House of Commons, in its wisdom, thought would be sufficient and adequate—3 p.ct. He looked forward to the time—and, to his mind, it could not be very long coming—when some alteration would take place in the basis upon which gas-works were carried on financially. He could not help thinking that as that particular House of Commons had now passed away and another had taken its place, someone would be able to convince the members that, while the Government borrowed money themselves at 5 p.ct., it was not reasonable to suppose a gas company could borrow it at 3 p.ct. It was absurd to suppose that a great undertaking like theirs could be properly carried on, and capital raised, while the return was fixed on such a ridiculous basis. Look at the accounts. If they made a simple calculation, they would find that salaries and wages to-day actually came to about 2s. per 1000 c.ft. of gas sold. Before the war, the price of gas was 2s. 2d.; and now actually salaries and wages were costing 2s. per 1000 c.ft. Then as to coal. If they divided the net cost of coal (after crediting residuals) by the gas sold, they would find it was costing somewhere round about 1s. 6d. per 1000 c.ft. In other words, salaries, wages, and net coal were costing something like 3s. 9d. per 1000 c.ft.; and this was for gas which they used to sell before the war at 2s. 2d. What was the use of a sliding-scale based upon a standard price of 3s. 1d. per 1000 c.ft., if salaries, wages, and net coal were going to cost 3s. 9d.? The sliding-scale surely must be just and equitable to capital, and must regard the matter all round. There were members of the public, and he thought many members of the old House of Commons, who seemed to believe that gas companies during the war were profiteering. This was to display the grossest ignorance. In the first place, they did not know what the companies were doing for the sake of the country; and they forgot—or else were ignorant of—the fact that the sliding-scale was such that, the lower the price of gas, the higher was the dividend, and *vice versâ*. In other words, while during the war the industry was faced with high cost of production, the shareholders actually got less and less out of it. Therefore, gas companies were the one institution who could not be profiteering, but who voluntarily gave their services to carry on the war, and at the same time suffered financially, because the sliding-scale kept down the dividend. The policy of this Company from the beginning had been (and in the future would be) to sell that which the consumer required—to supply the best possible gas at the lowest possible price; and the lowest possible price meant to the shareholders the highest possible dividend.

The resolution was agreed to.

DIRECTORS AND AUDITOR RE-ELECTED.

On the proposition of the CHAIRMAN, seconded by the DEPUTY-CHAIRMAN, the retiring Directors (Mr. John Mews and Mr. Frank Bush) were re-elected. The retiring Auditor (Mr. T. Spooner Soden) was also re-appointed.

AN EXTRAORDINARY GENERAL MEETING.

The CHAIRMAN: That closes the business of the meeting, which now becomes an extraordinary meeting for the purpose of electing a Director; and I will ask the Secretary to read the notice convening it.

The SECRETARY read the notice convening the meeting.

MR. A. M. PADDON ELECTED A DIRECTOR.

The CHAIRMAN: I now have to move—

"That Mr. Arthur Matthews Paddon be elected a Director of the Company, in the place of Mr. John Ewart, deceased."

The late Mr. John Ewart was one of the best friends the Company ever had, because he was whole-heartedly in sympathy with its aims—whether in respect to co-partnership, or the aspirations of labour, or the rights of shareholders, or the future of gas. He was one of the most helpful councillors whom we ever had on the Board—a man of common-sense, liberal understanding, and who could always be relied

upon to give a helpful opinion on the various matters that arose for discussion. I express the feelings of the whole of my colleagues, when I say that we mourn the loss of a dear friend by the death of Mr. John Ewart. The task falls upon us this afternoon of electing in his place Mr. Paddon; and if the motion is carried—as I hope it will be—we shall then be able to say we have an acquisition to the Board, in a gentleman who is deeply concerned in gas problems, and who, as Chairman and Director of several other undertakings, has a very large interest in gas supply. There is the advantage about a selection of this kind that the candidate's future is bound up very largely—if not, I may say, wholly—with the future of gas. This is really most important, because the industry is faced with very difficult problems in the near future. It is faced with the problem of securing fair remuneration for the capital invested in it. There is another difficult task when deciding what course it shall follow to meet the threatened increase in competition by the supply of electric energy. We do not fear this competition. All that we ask for is that, in the national interest, there should be fair play as between the two competitors. In determining upon a policy of this kind, which is fraught with consequences that may influence the future for many years, it is very necessary to have the advice of those specially qualified to give it. Mr. Paddon, it is felt, possesses these necessary qualifications; and therefore I have very great pleasure in proposing his election as a Director.

The DEPUTY-CHAIRMAN formally seconded the motion.

The resolution was carried unanimously; and the proceedings were brought to a close with a vote of thanks to the Chairman for presiding.

COMMERCIAL GAS COMPANY.

The Ordinary Meeting of the Company was held last Thursday, at the Cannon Street Hotel, E.C.—Mr. W. G. BRADSHAW in the chair.

The SECRETARY (Mr. F. J. Bradfield) read the notice convening the meeting; and the Directors' report and statement of accounts were taken as read.

END OF WAR AND A PERIOD OF DIFFICULTY.

The CHAIRMAN, in moving the adoption of the report and accounts, said: This is the tenth occasion on which the Directors and shareholders of this Company have met since the outbreak of war. Nine meetings were held amid the stress and strain of the greatest war which the world has experienced; and we are thankful now to meet at a time when victory has, by the blessing of God, been achieved, and peace, though not yet attained, appears to be in sight. Our nation, however, is left with an evil legacy of debt, disturbance, and unrest. A very large number of men have laid down their lives for the Empire, and they cannot be spared; and many have been incapacitated to a greater or less extent owing to wounds and ill-health. It is estimated that our National Debt will amount to no less than 8100 millions, of which it is possible that some 1682 millions may be recovered from the sale of surplus assets of war material, and by the repayment of loans to our Dominions and to our Allies—leaving us at the very best estimate at the end of the war with a burden of debt amounting to 6418 millions, which is nearly ten times the amount of the National Debt in August, 1914, when it was only 650 millions. But more serious than this heavy burden of debt is the spirit of unrest which has manifested itself both at home and abroad, and which threatens more seriously the future of the country than any peril from outside can possibly do. We must remember, however, that the world at large and our country in particular are in the position of a patient who has suffered during the last four years from a serious illness, or has undergone a grave operation, which has tried his constitution to the utmost; and we must expect a period of difficult, painful, and slow convalescence. In my opinion, there is no need for pessimism, because the war has proved that the heart of the nation is sound; and if, as I have no doubt will be the case, we show ourselves worthy of our hero dead, who stopped short of no sacrifice on behalf of the country, our difficulties, however serious and menacing they may be, will be successfully surmounted. We shall, however, need to display all the courage, patience, and wisdom, and to exercise all the self-denial which we individually possess, if the country is to be restored to the position which it held, and to the prosperity which prevailed, before the war. He who stayed the German onrush at Mons, and delivered the Allies from their desperate offensive last March, will not desert us now if we put our trust in Him, and seek His help.

EFFECTS OF THE WAR UPON THE COMPANY'S BUSINESS—HIGH WAGES AND PRODUCTION.

At our previous meetings, I have alluded to the effects of the war upon the affairs of the Company. As we look back over the four-and-a-half years which have elapsed, we must be thankful that, in spite of difficulties and losses, the Company have come safely through it, and that the outlook is promising. Already a period of convalescence is beginning; and although the process of returning health may be slow and troublesome, I have no doubt that complete recovery lies before us. Without taking up your time by a long exposition of all the Company have suffered owing to the war, I will lay before you one fact which shows how serious the disturbance has been. In 1913, the last full pre-war year, we sold 3402 million c.ft. of gas which cost £444,288. Last year we sold 3546 million c.ft. of gas which cost £837,540—*i.e.*, the sales had increased during the war by only 5 p.ct., but the expenditure (for which the higher price of residuals only partly compensated) increased by no less than 88 p.ct. A large part of this increased expenditure consisted of wages; and the following figures are noteworthy: In 1913, salaries and wages cost the Company £144,253; in 1918, they cost £289,789—an increase of over 100 p.ct. In the same period your dividends, which in 1913 amounted to £112,503, fell to £65,688 in 1918—a decrease of 41·6 p.ct. It is clear I think from these figures that the Company have fully met the extra cost of living so far as their workmen are concerned; and there does not appear to be any justification for the demand which has recently been put forward by the National Federation of Gas Workers for a further increase of 10s. a week. The increases granted to the men since the commencement of the war have been a war bonus or wage (as it is called now) of 23s. 6d. a week, and, in addition, 12½ p.ct. upon the whole of their pay—pre-war and war wage included. This increase has amounted, as I have pointed out, to over 100 p.ct. in the aggregate wages. In the case of the lower rates of pay, it is more than 100 p.ct.; but in the case of the higher paid workmen, it is rather less. It is difficult for the working men of the country to understand that the high rates of pay which have been given during the war—more particularly by Government Departments—cannot be increased or even continued when peace conditions once more return. The business of the country during the war has been conducted upon an artificial basis. To a large extent, we have been mortgaging or realizing and living on our capital. There is a danger—a grave danger—that the cost of production may be forced up so high by the demands of the workers for short hours and high wages that we shall be unable to compete with other countries in the markets of the world. The result of this must be loss of trade and general impoverishment, followed by lower wages and longer hours. In America, the principle is well understood that high wages and a high rate of production must go together. But in this country we have not yet learnt this lesson; and this applies as much to employers as to workmen. Until it is fully appreciated, our commerce cannot be placed on a sound basis, and consequently our prosperity must suffer. As regards our own Company, a supply of cheap gas produces larger sales, and enables us to employ more men, but dear gas means smaller sales with fewer men employed, and the inevitable result in the future of lower wages. I am happy to say, as I have said on many occasions, that our relationship with our workmen is all that can be desired. We as your Directors and managers are anxious to foster even closer bonds of union with the men, and a more intimate exchange of ideas than in the past. At the present time we have under consideration the best means of bringing this about by the formation of Committees on the lines of the Whitley report, or some similar system. I had occasion the other day to inquire the ages of the men and the length of their service at one of our stations; and I was astonished to see how many had spent nearly the whole of their lives in our service. I was very gratified, because it shows they appreciate its conditions and what has been done for them.

A COMMITTEE OF EMPLOYERS.

Since we last met, the National Gas Council has been reorganized, so that it now comprises the representatives of all the important gas undertakings of the Kingdom, both company and municipal. This Council, it is hoped, will represent the common interests of the industry, enabling it to act as a whole, and at the same time secure a greater uniformity of practice. It is hoped also that it will be able to deal with all questions of employment which are common to the various companies, and that in this way disputes may be avoided, and greater harmony promoted between employers and workpeople. In order to attain this object, it is proposed to form national and district industrial councils on the lines laid down by the Whitley Committee, to which councils questions affecting the relationship of capital and labour may be referred for settlement. We hope in this way that our relations with the men may continue as satisfactory as at the present time.

THE BENEFITS OF PROFIT SHARING.

One effect of the increased price of gas has been the diminution of the profit-sharing bonus given to our employees—in fact, the bonus would have completely disappeared if the Directors had not resolved to give the men a minimum bonus of 1¼ p.ct. on their pre-war earnings, with a view of keeping the profit-sharing scheme alive. Our managers and heads of department are unanimous in expressing the opinion that the profit-sharing scheme has been of great benefit to the Company in promoting goodwill and good work, and that while the workmen have been enabled to make some provision, though not a very large one, for their old age, the Company have received a full return for the money which the scheme has cost it. We should like, if a way can be successfully devised, to extend the scheme so as to promote thrift still further, and to enable our employees to accumulate additional provision for the time of need. Everything which binds the men to the Company is of advantage to the concern.

LOSSES ON THE FIELD AND THE RETURNING MEN.

I regret to have to say that, since we met you last time, nine more men of the Company's service have died while serving in his Majesty's Forces; bringing up the number of those who have laid down their lives for their country to 43, which is more than one-tenth of the number who joined the Army. No word can express the debt of gratitude which we owe to them, or our admiration for their self-sacrifice. The survivors of those who joined the Forces are beginning to return from active service; and we find from letters received from them that they fully appreciate what the Company have done for them in the way of making up their salaries and wages while they have been absent, and in keeping open their positions pending their return.

A REDUCTION OF SIXPENCE IN PRICE.

Last August I announced that we had had to increase the price of gas from 3s. 6d. per 1000 c.ft. to 3s. 10d.; and subsequently we were compelled to raise it as from the end of September to 4s. 2d. per 1000 c.ft. At that time, the war was at its height. Although success was beginning to attend our arms, victory was by no means secured; and it looked as if the war might drag on for many months. When the armistice came in November, the whole situation changed so far as we were concerned. The Company's ships began at once to run more regularly; the cost of insurance against war risks fell; and we were able to revise our estimates for the half year. We had anticipated previously that we should not make enough profit in the half year to pay even the reduced dividend; but, owing to the change, we were able to look forward to having a small surplus over the dividend. At the end of the half year, things had begun to improve still further; and at the beginning of this month, a careful estimate made by our most accurate Secretary and Accountant (Mr. Bradfield) showed that we might anticipate that the current half year would

show very considerable economies on the previous half year. Basing our calculations on this estimate, and taking into account all known reductions in the cost of raw material and manufacture, and also some extra charges which may possibly fall upon the Company, we have come to the conclusion that we shall be justified in reducing the price of gas by 6d. From the beginning of the current half year—making it 3s. 8d., instead of 4s. 2d., per 1000 c.ft. We are, of course, fully aware that, in making this large reduction, we run some risk of not having sufficient profit to pay the dividend; but we think it advisable in the interests of our consumers, and in order to promote the business of the Company, to make a substantial reduction in price as soon as circumstances appear to permit. As you know, we have a sum of undivided profit brought forward. One result of the reduction I have spoken of will be that the dividend will be calculated on the scale fixed by the Company's Act of 1902, and will be slightly in excess of the meagre rate authorized by the Statutory Undertaking (Temporary Increase of Charges) Act of last year. The rate of dividend authorized by the Commercial Gas Act, 1902, when the price of gas is 3s. 8d., is £3 6s. 8d. p.ct. on the 4 p.ct. stock, and £2 13s. 4d. p.ct. on the 3½ p.ct. stock. I hope that we may be able to maintain this reduction, and that it is of good augury for the returning prosperity of the gas industry.

THE NEW BILL.

We have to report that the Bill promoted by the Company in Parliament has received the Royal Assent; so that we are in a position to raise fresh capital as it is needed, and in the way which will be most advantageous to the Company. Without the Bill we were hampered and restricted in every direction. Our capital account is overdrawn to the extent of £112,274; and we shall need in the near future to make further expenditure on capital account to cheapen the supply of gas. But until prices of material and labour fall, we cannot undertake any work, unless it is urgently necessary.

A PROFITABLE FLEET.

The events of the past half year have demonstrated once more the value to the Company of owning its own fleet of steamers. Throughout the war, our coals have been carried more regularly, and more economically, than would have been the case if we had had to charter vessels at market rates. Now that hostilities have ceased, and our ships are beginning to resume their normal number of voyages, we shall not require so many ships; and we shall be able to sell some of them at a handsome profit on the price we gave for them. It is to us, and it will be to you, a cause for deep thankfulness that our ships have entirely escaped disaster throughout the war, although both the other Metropolitan Companies have suffered heavy losses in this respect; and we are also thankful that our works have not been damaged in any of the air raids.

A SMALL REDUCTION OF GAS SALES.

The accounts shew that our sales of gas have been reduced by 3 p.ct. on the quantity sold in the corresponding half of 1917. This reduction is considerably less than we expected. The Coal Controller's Fuel and Lighting Rationing Order has had a comparatively slight effect on the Company's output of gas. The reason is that our district is occupied principally by a residential population who are penny-in-the-slot consumers, with an average consumption less than the minimum under the rationing scheme, and by factories and works which were not rationed. Other neighbouring companies have experienced heavier reductions than we have. For instance, compared with our reduction of 3 p.ct., the Gas Light and Coke Company had a reduction of 7 p.ct. for the year, the South Metropolitan Gas Company of 12 p.ct. for the half year, and the Brentford Gas Company of 7 p.ct. for the year. It is interesting to note that the gas sold to prepayment meter consumers in the half year to June showed an increase of 5 p.ct., and in the half year to December an increase of 7 p.ct.—showing, I think, that the poorer class of consumers found a very valuable resource in gas as a means of escape from the high prices of coal. On the other hand, our consumers through ordinary meters showed a reduction of 10 p.ct. in the December half year.

COAL, OIL, AND RESIDUALS.

Turning to the accounts, I have very few remarks to make. A comparison with the corresponding half of the previous year would not add much to your knowledge of the position of the Company, because both half years were passed under wholly abnormal circumstances. The cost of coal once more mounted up, and was higher than during any previous half year. In December, 1917, it was 38s. a ton; in June, 1918, it was 35s. 5d. a ton; and in December, 1918, it was 38s. 5d. a ton. But this increase is accounted for by the fact that the Coal Controller in July last authorized a further increase of 4s. per ton f.o.b.—in fact, if it had not been for the large reduction in war risks insurance for the last six weeks of the year, and the better running of our ships, the price of the coal which we bought would have been over 40s. per ton. The prices paid for coal in the North f.o.b. showed an increase of 70 p.ct. over the price paid in 1914; and freight and shipping charges, an increase of 279 p.ct. over 1914. Coal into the Port of London cost more by 117 p.ct. I can recollect when we bought coal as low as 5s. 6d. per ton in the North. The miners are agitating for a further increase in their wages and for shorter hours; and this may mean a higher price for coal in the current year. But it is probable that the cost of coal into the Company's works will be less by reason of the discontinuance of war risks insurance, and a possible reduction in the amount paid for insurance against marine risks, and a probable increase in the number of voyages made per vessel, which, as I have stated already, shows considerable improvement. In the first half of the year 1918, our ships averaged 14·3 voyages, and in the last half of the year 17 voyages. There has been a large reduction in the controlled price of oil; and if, as we have reason to suppose will be the case, this price is continued, or further reduced, it will help the Company's accounts in the current year. I have more than once when addressing you complained of the low controlled price for residuals. Owing to the agitation of the companies, this has been materially rectified with regard to coke. Coke, which was selling at 31s. 8d. per ton at the works in July, rose to 36s. 8d. per ton in December. The price of tar increased from 3·376d. per gallon to 3·541d. per gallon. In spite of a treble change by order of the Ministry of Munitions from concentrated ammoria manufacture to sulphate of ammonia and back to concentrated ammonia, and then back again to sulphate of ammonia, a fair price was obtained. and residuals, which yielded 21s. per ton of coal in the first half of the year, gave us 24s. 4d. per ton of coal in the second half of the year.

WAR WAGES.

War wages cost the Company £58,669 in the half year, and active service allowances £3667—together £62,336, which is equivalent to more than 8½d. per 1000 c.ft. of gas. In December, 1917, the cost of these items was only £33,605.

THE FINANCIAL RESULT AND THE DIVIDENDS.

The profit shown by the revenue account is £53,887. In the corresponding half of 1917, it was £35,537—a difference of £18,350. Deducting the interest payable on our debenture stock and on our temporary loans, which amounts to £14,897, we have a net profit left of £38,990. The dividend, I am sorry to say, only absorbs £30,049, leaving £8941 to be added to the undivided profit carried forward to the current year, and making it £43,258. Since the beginning of the war, we have drawn upon this undivided profit to a large extent. In the four half years ending June, 1918, we depleted it by no less than £52,555. As I have often explained, the possession of a moderate sum of undivided profit is of benefit to both consumers and shareholders, because it tends to prevent frequent changes in the price of gas. The dividends which we recommend are the very meagre ones permitted under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. In order to obtain authority to pay them, we had to make an elaborate application to the Board of Trade, and furnish them with a special certificate from the Official Auditor. We hope that we shall not again come under the operation of this Act; but, even if this is the case, it will be necessary for Parliament to revise the scale of dividends permitted if gas companies are to be in a position in the future to raise at reasonable rates the money required for their undertakings.

THE STAFF AND OTHER EMPLOYEES.

I desire, in closing these remarks, once more to bear my testimony to the steady good service of the Company's employees, both male and female. They have done well throughout the trying time through which we have passed. We all recognize and are grateful to those who have served in His Majesty's Forces; but we must not forget how much we owe to those who have worked for us at home. They have carried on the work of the Company with greatly depleted numbers, and with inexperienced assistance, but all alike—managers, clerks, and workmen—have devoted themselves to your service, and the working results, which have been fully maintained, testify to the excellence of their work, and the success of their endeavours. With regard to the future, we have not by any means overcome all the evil results of the war; but I believe that the day is beginning to dawn, and that the Company has prosperous times in front of it.

THE GENESIS OF EXTRAVAGANT RATES OF PAY.

Mr. H. E. JONES, in seconding the motion, said the statement made by the Chairman had been to him one for extreme gratification—particularly in respect of the plum which had been given to them by the Chairman in the form of a reduction in the price of gas. Peace had brought comfort to them; and, above all, he congratulated their hard-working staff on the release it meant to them from the pressing, daily irksome anxieties and worries which this terrible war had imposed upon everybody responsibly engaged in public service—gas, water, electricity, or anything else. Great upset was evident in the labour market; and this was simply due to the enormous disproportion in the earnings of comparatively unskilled men with what they ever had before, and with what they could have in the future, if the nation could survive. Their own men who had been contented with the war bonus naturally had been upset with the disparity. The upset was due to the unprepared condition of the country for war. He was a member of the Munitions Committee for the Metropolis; and he knew what it was. They had to force the production of shells, guns, and explosives material, in which this Company, as well as other gas companies, took a large part in furnishing the necessary materials, many of which the country did not possess, as did the Germans, until the gas undertakings came to the rescue with toluol and other materials. Such was the condition; and it was imperative to get these shells and guns at any price. Some of the trade unions, working upon this position, extracted from the Government rates of wages which were, he felt, absolutely absurd. He served his articles in a works where he worked alongside and with the men, and so he could talk to them comfortably and freely and easily about their labour; and he could sympathize with their proper aspirations. The whole thing had been upset to their well-behaved, industrious men by having alongside them unskilled men and women getting wages which they never dreamed could have been possible. This had been accentuated by the hasty action of an inexperienced Minister who gave skilled men a percentage, which naturally soon spread to every form of labour in the kingdom. How they were to reconcile this was the problem of the future, and was a problem of which the Company's staff and all of them might have bitter experience before it was solved. Some men were asking for these conditions. They would have to learn that there was not enough money in this country to satisfy such demands; and he hoped they would learn it without dragging the country through terrible misery. It was gratifying that the Company had been able to give the reduction of 6d. in the price of gas, which was a good feature in the history of gas companies; and he was proud of his old Company.

The motion was unanimously carried.

DIVIDENDS.

Proposed by the CHAIRMAN, and seconded by Sir FREDERICK GREEN, K.B.E., dividends were declared at the rates allowed by the Statutory Undertakings (Temporary Increase of Charges) Act at the rates per annum of 3 p.ct. on the 4 p.ct. stock and £2 12s. 6d. p.ct. on the 3½ p.ct. stock.

RE-ELECTIONS.

The CHAIRMAN moved the re-election of Messrs. H. D. Ellis and

Mr. W. H. Gell to their seats at the Board. He said he thought nobody had had a longer or more honourable career in the Company than their friend Mr. Ellis. Both Mr. Ellis and Mr. Gell had, by wise counsels, proved themselves devoted to the Company.

Mr. ROLAND YORKE BEVAN seconded the motion, which was heartily carried.

Mr. GELL and Mr. ELLIS having responded,

Proposed by Mr. GROVES, and seconded by Mr. YOUNGS, the retiring Auditor (Mr. S. W. Savage) was re-appointed.

VOTES OF THANKS.

Sir FREDERICK GREEN proposed a vote of thanks to the staff and the employees. He remarked that the proprietors had heard both from the Chairman and the Deputy-Chairman of the very difficult position in which most works now stood in this country; but he was glad to say that, notwithstanding the unrest which was abroad all over the world, the Company had suffered very little from it through their workmen. He believed the reason was found in the truth of the old saying that "good masters made good men." The men realized that they had in Mr. Stanley Jones a General Manager who not only knew his work, but he knew what he ought to do, and was always ready to listen to any little difficulties that were put before him. This was the potent reason why they had such little trouble with their men. In Mr. Bradfield they had one of the best secretaries it was possible to have; and his staff worked well under him. He had the figures at his fingers' ends; he knew what ought to be done, and saw that it was done.

The CHAIRMAN seconded the motion, which was heartily agreed to.

Mr. STANLEY JONES, replying on behalf of himself, staff, and men, said that both the Chairman and Sir Frederick Green had given an optimistic view of the feeling of the men towards the Company; and he could testify to the correctness of their view from personal experience. His father brought him into the Company when he left school; and twenty-five years had since passed away. He had been among the men as his father was before him; and he could claim to know something of them. All the officers and the men rubbed along well together. They sat on Committees together, and talked together on subjects of mutual concern. In this way they got along all right. These labour troubles that were heard of were serious matters, which, in his opinion, arose largely because the management did not get into touch with the men. They had a magnificent example in the case of the South Metropolitan Gas Company; and the Commercial Company had shaped their methods on that model. It was only due to the South Metropolitan Company that this should be said. The Company had had no internal trouble, though they had lately passed through serious times. Their steamers had been kept running through the war; and he believed their smallness had been their salvation, and had saved them from mines and other dangers. Their crews, too, had behaved well. He felt the labour question was the most important thing in view; and he should like to add his testimony to that of the Chairman and Sir Frederick Green as to the loyalty of their men. The proprietors need have no fear that the men would let them down.

The SECRETARY, having thanked the proprietors on behalf of his staff and himself, said it was needless to say the work of the past four years had been very trying. It would also be so in the future; but they were relieved from the great strain (which showed itself in the faces of some of the men) during those months when air raids were almost daily. They viewed the future much more cheerfully than they did a year ago.

Proposed by Mr. GROVES, and seconded by Mr. RAKE, a very hearty vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN acknowledged it; and this concluded the proceedings.

TOTTENHAM DISTRICT LIGHT, HEAT, AND POWER COMPANY.

The Ordinary General Meeting of the Company was held last Saturday, at the Offices, No. 639, High Road, Tottenham—the Rt. Hon. Sir DANIEL F. GODDARD in the chair.

The SECRETARY (Mr. E. J. K. Fussell) read the notice calling the meeting; and the Directors' report and the accounts for the half year to Dec. 31 were taken as read.

RELIEF FROM WAR STRAIN AND THE LOSS OF GALLANT MEN.

The CHAIRMAN, in moving the adoption of the report of the Directors and the statement of accounts, said his first words must be of hearty congratulation and of deep thankfulness that the heavy cloud of war which had overshadowed the country for more than four long years had passed away. This fierce and cruel strife, which had paralyzed so many of their industries, which had decimated their manhood, and saddened so many of their homes, had now come to a happy end. And that day they met with a sense of security, which had been absent from them for a long time. They had had to pass through some terrible times. He might use the words—the prophetic words—of the Poet Laureate Tennyson, written long before there was any dream of present methods of warfare:

> **Heard the heavens filled with shouting,**
> **And there rain'd a ghastly dew**
> **From the nation's airy navies**
> **Grappling in the central blue.**

They knew all about it in their gas-works; and they knew and rejoiced that the danger from these "airy navies" which flew by night, and from the alarms and terrors that threatened by day, were things of the past. Though they were happily things of the past, they had left their scars. They could not forget. They could not bring back the gallant men who had laid down their lives in the service of the country. All they could do was to honour their memories as they thought of them as men who died doing their duty. He might say that from their Company 312 men enlisted in the Army. Of them fifty had been killed in action, or died from disease. Now some 63 had come back to them; and they welcomed them again in their midst. [Applause.]

A MUCH-REDUCED COAL STOCK.

The report for the half year did not call for much remark; but there were a few points of interest to which the proprietors might wish him to allude. Like the poor, the question of coal was always with them. In this respect, the half year through which they had passed had been a very trying one—indeed, their stocks of coal had been depleted. The supplies had come in very slowly and irregularly. The quality, too, had been bad; and as the quality had gone down, almost inversely the price of coal had gone up. In spite of these difficulties, they had managed to pull through. Their Engineer and General Manager (Mr. A. E. Broadberry) had had many hours, days, and weeks of anxiety, which had, he felt sure, added some grey hairs to his head, if not deprived him of some. [Laughter.]

RATIONING ORDER EFFECTS.

Then they had had the Fuel and Lighting Rationing Order in full operation for part of the half year; but for the first three months it was only partially so. People lived with the fear of the Controller in their hearts; and this induced them to some cautious methods in the use of their gas. During the last three months, the Order had been in full force; and he might say at once it had had a serious effect on their output. In the Michaelmas quarter, although the Order was not strictly in force, everyone was affected by it. Taking the residential quarters of their area—excluding those who took gas through the penny-in-the-slot meters—there was a decrease of 11 p.ct. in the gas sent out. In the Christmas quarter (with the same exclusion), and remembering also that in the middle of November the armistice was signed, which had a serious effect upon the requirements of the munition factories in their area, the decrease was 18 p.ct. The proprietors might perhaps remember that, at the last meeting, he told them that he estimated the loss to the Company of the action of the Fuel and Lighting Rationing Order would be something like 2¾d. per 1000 c.ft. of gas. He noticed that the "GAS JOURNAL" criticized him a little on this point, wondering how he had arrived at such a calculation. It was a very simple one. He took all the revenue charges, with the exception of the net cost of coal, as remaining just the same, whatever the quantity of gas that was sent out. These were the standing charges, which they could not reduce. He then estimated that the effect of the Order would be that they would lose 10 p.ct. consumption of gas. Making a financial calculation of this, it would be found that he was not far off the mark when he said it would cost the Company 2¾d. per 1000 c.ft.

NO ADVANTAGE FROM THE TEMPORARY INCREASE OF CHARGES ACT.

In passing, he might mention that from the Act which was passed in the last session of the last Parliament, and which was called the Statutory Undertakings (Temporary Increase of Charges) Act, the Company derived no advantage whatever, nor would they get any benefit from it. The Act was framed in a somewhat niggardly spirit; and until the price of their gas rose to 4s. 3d. (at present it was 4s.), they could not have recourse to it. He would like to say this to the stockholders that, unless the price of coal materially increased (which was a matter not within the power of the Board to control), and labour rose still more, the Board hoped they would not have to advance the price of gas above its present rate. Therefore, they would not gain any advantage from the Act.

FEATURES OF THE ACCOUNTS.

Coming to more prosaic matters, he would call attention to the accounts. The capital account did not need much comment. There had been an expenditure of £13,466. This expenditure was in the first place for buildings in the new No. 3 section, which was not yet fully in work. Upon them £3084 was spent. The Ponders End works had been completely restored and extended at a cost of £7882. There was some other expenditure; and from the total deductions were made for stoves and appliances sold (which had been carried to capital account) and for depreciation—amounting together to £7595; and leaving the net addition to the capital account for the half year at £6342. The capital account now stood at £488 per million c.ft. This was rather a high figure. There were many gas undertakings much higher; but, in his judgment—speaking as a practical engineer—their figure was higher than it ought to be, and higher than it was wise for it to be. The proprietors, however, must remember the reason for it. They had spent a good deal of capital which up to the present had not been productive. For instance, they had a large gasholder tank; and there it had been standing unused during these years of war. They had not obtained a single penny from this capital outlay, because they had not been able to put a holder into the tank. There was also a good part of the expenditure on No. 3 section of the works which had not yet been productive. Although, therefore, the figure was a little high now, there was every probability, when they got the plant into full working order, the capital expenditure per million cubic feet would be reduced.

MANUFACTURING MATERIALS AND WAGES.

Turning to the revenue account, there was an increase of 7874 tons in the quantity of coal carbonized; and the cost of this coal was about 4s. per ton more than in the corresponding account. But a rather serious feature was that the stock of coal had been reduced from about 55,000 tons to 5000 tons. The proprietors would appreciate that all the coal they had to use now was at the highest price; and they would also see that they had not a large amount of stock in hand from day to day. Indeed, in some weeks they had been very anxious about maintaining the supply of gas. The expenditure of oil for enriching gas had decreased by 147,017 gallons. The reason of this was that the Government had controlled the supply of oil; and therefore the price had gone up—this being the usual effect of Government control. In this case, it sent the price up to 1s. 6d. per gallon, which was so high that it rendered it more expensive to make this kind of gas than coal gas. Therefore, they had used as little oil as they could. Fortunately, residuals had done very well indeed. The receipts from them had increased by £18,078, which had materially reduced the net cost of coal. If the proprietors would look at the revenue account, they would see there was rather a large increase in the expenditure on repairs and

maintenance—£2638. It would, however, be remembered that the cost of everything they used had gone up enormously. Materials had advanced in price 100, 200, and in some cases 300 p.ct. Wages had also nearly doubled. For instance, out of the increase of £2638, £1921 was due to higher wages. Mentioning the subject of wages, it was interesting to note that the total wages this half year (exclusive of their contractors' wages, which, of course, they could not control) had mounted up to £60,148; for the corresponding half of 1914, before they were really affected by the war, the amount was £34,000. This explained a great deal of what had happened. He was not complaining of this; he was not finding fault with it. He was only making the statement to show how the cost had risen. They would see this item reflected in the revenue account under the head of war bonus, which now stood at £22,227, against £9234. Last October there was a great conference between labour and employers on the subject of wages; and an additional 3s. 6d. was then given to all the workers, with the unfortunate 12½ p.ct. which had been planted on them all over the country. The arrangement entered into had been working satisfactorily. It, however, came to an end on Feb. 1 this year; and, at the present time, conferences were going on as to what should be done in the matter now—as to what was the fair and just way of dealing with it.

CO-PARTNERSHIP AND THE PENSION FUND.

He might call attention to an item in the revenue account, £750, under the head of "Co-Partnership—Pension Fund." Last year there was no item there; it came under the head of pensions fund. The Board asked the Secretary to put the item under co-partnership because of this: They had a pensions fund; and the Company found one-half, and the men one-half of the money; and previously two-thirds of the men's half was supplied out of the co-partnership bonus. When the price of gas went up, the co-partnership bonus went down, until ultimately it disappeared altogether. The Directors felt it would be a hard thing for their older employees who had been for years in the Company's service to lose the pension when they came to retire, so they made this offer to the men. They had, therefore, paid the two-thirds which they would have had from the bonus out of the revenue of the Company. This was the £750. No one he thought would disagree with this.

SALE OF GAS, AND AN UNFORTUNATE EXPERIENCE.

As to the sale of gas. The price was now 4s. per 1000 c.ft. It was raised 4d. at Midsummer, and 4d. at Michaelmas. The Company had not therefore had the full advantage of the last 4d. increase—only for a quarter of the year; so they had this half year some little benefit to come from this. On the other hand, they had not felt the full effect of the rise of wages, which had only been in operation the last three months of the half year. While talking about the sale of gas, he ought to mention that they had had rather an unfortunate occurrence that week. They had two or three very serious accidents at the works—accidents which they could not really avoid. Pieces of timber or pit props came in with the coal; and, being hidden by the coal, when the trucks were tipped into the breaker-pit, they jammed in the coal-crusher, and stopped, and broke down the machinery. One accident often led to another. They had a great deficiency of gas; and the result was, he was sorry to say, they had to reduce the pressure in the district for a day or two. They regretted very much having to do this; but they could not always control these things. The difficulty had now been got over. Repairs had been made; and they were supplying at full pressure again.

PUBLIC LIGHTING.

There had been a little grumbling in the district on account of the public lighting. This, he daresay, was quite warranted. They had some 7000 street lamps in their area; and out of these 6000 were dismantled during the war, because the lighting was restricted. When lamps were dismantled, they got out of order. Pipes got partially blocked; and it was very difficult to reinstate and readjust the lamps. It must take time. If they had had their full complement of men (which was formerly 65) engaged on this work, they could have done it very quickly. But most of the men were at the war. They only had twelve; and therefore the work took a long time to carry out. They were getting over it as fast as they could, and then all cause of complaint would disappear. An additional six men had now returned, so that they had eighteen at present at work on the lamps.

UNACCOUNTED-FOR GAS.

The unaccounted-for gas was lower than it had been since 1913. It was now 8·15 p.ct. Although it was always higher in the second half of the year than in the first half, it was in his judgment still too high; and he was sure it would be the aim of the Engineer, as it was the desire of the Directors, to get the unaccounted-for gas reduced. In his (the Chairman's) opinion, it ought not to be more than 5 p.ct.

OTHER POINTS.

The revenue profit was £27,163, compared with £28,618; but in the corresponding account, there was £2000 carried to renewal account. This year they had not been able to transfer the amount. If they had done so, the figures in the account would not have looked so well as they did. There was a little reduction—10 p.ct.—on the electricity account owing to the Rationing Order; and so the profit had been reduced somewhat. Under the head of the profit and loss account, the charges amounted to £17,023, compared with £13,678. If the proprietors wanted to alter this, they must appeal to the Chancellor of the Exchequer; for the increase was a question of income-tax, and income-tax alone. They had withdrawn from renewals account £5977 for the plant reconstruction at Ponders End.

DIFFICULTIES AHEAD, BUT GOOD AIMS.

As to the future, he was not prepared to make any great prophecies. There were portents in the air which told them of troubles and unrest. Storm signals were up; and he was afraid there were a good many difficulties before them. Their aim and chief object was to be fair to all. They wanted to be fair in their dealings with labour; they wanted to be fair to the stockholders who supplied the means of employing labour. They wanted to be fair to those who bought the product of the means the stockholders supplied, and of the labour that was employed. If they were fair to all, he thought the proprietors would agree with him that they might "look the whole world in the face, and fear not any man."

Mr HENRY BAILEY seconded the motion.

PROPRIETORS AND THE LOW STATUTORY DIVIDENDS.

Mr. MICHEL said the proprietors met for the first time for nearly five years in circumstances which caused them the greatest feelings of thankfulness. They associated themselves with what had been said by the Chairman with reference to those who had suffered in the national cause, and had been in the service of the Company. Their feelings were of gratitude to their memory, and sympathy with the relatives they had left behind. As to the general affairs of the Company, he regretted the proprietors were not in future going to meet more than once a year. It was a good thing they were more cheerful than formerly on national grounds, because they had a good deal to make them depressed as holders of gas stock. Although one did not want to take a pessimistic view of the Company, the fact remained that the man or woman who had invested before the war (say) £500 in the Company would receive in dividend now only about half of what was received then. This was partly due to the increase in the income-tax, but it was also due to the decreased earning power of the Company. It was a well-managed Company; and they felt under great obligation to the Directors and the officials. They sympathized immensely with the Engineer in the anxieties he had had during the last four or five years; but the proprietors knew they themselves were only receiving half of what they received three years ago. As to the price of coal, it was very questionable, even if the Directors could do so from other points of view, whether it would be remunerative to the Company to increase the price of gas any further. Coal was a momentous matter for them; and he was sorry the Chairman said it had nothing to do with the Board, or that they had no control over it. He ventured to think they had. They were influential members of the general public. The mines were under the control of the Government; and he submitted that it was for the Directors to represent to the Government how very serious were the enormous increases in coal prices to the industries of the country. When a considerable section of the community associated with employment went to the Government last year, and asked for an increase in their remuneration, the reply was, "Certainly." The Government did not inquire what would be the result, or how many people would suffer. They were bent apparently upon getting over an immediate difficulty, instead of dealing with the question of principle. He ventured to say it was now for the Board to represent to the Government the seriousness of the price of coal. The matter ought to be approached by those who were not seeking sectional or political interest, but were considering the interests of the whole community. Then with reference to rating, he had always understood that the rating of gas and water works to a large extent followed profits. If this were so, then surely they were entitled to a considerable reduction in their assessment. The one bright spot was the prospect of a considerable decrease in the price of oil. He also urged the Directors to do all possible to cultivate the electrical section of the business.

Mr A. MORGAN thought the Board and Mr. Broadberry deserved to be congratulated on the results shown in the accounts. There was no doubt they had come through very difficult times; and he did not know of any undertakings in the country that had been so hard hit by the war and Government control as had been gas undertakings. The Government had insisted upon gas companies producing bye-products for munition purposes; and they had refused to give a fair price for them, or to make up to the gas companies, as had been done with the railway companies, the dividends to pre-war figures. The Fuel and Lighting Rationing Order, too, was nothing more than a bogey set up to frighten people. Its limitations were ridiculous; and when at the end of it they were booed at with a threat of six months' imprisonment or £100 fine if the limitations were exceeded, it confirmed the ridiculous character of the whole thing. At the same time, it was put up as a bogey to frighten people into economy; and it succeeded. Many people economized because they felt the Government would not descend to this policy unless there had been some reason for doing so. Influence must now be brought to bear upon the Government to abolish central control. Everybody was tired of it, and wanted to get back to freedom. Having referred to coal output and wages, he said he believed bottom had now been touched; and the Company were bound to realize a better state of things in the future. If they could not get enough coal at home they must go to Germany. They had there more coal than the other countries in Europe; and he did not know why German coal should not help to pay for the war. Further, their Allies did not now need so much coal; and so in respect of raw material, he thought they ought soon to be on the upward move. They had to get men to feel they were being dealt with fairly; and he believed there was too much sanity in this country for Bolshevism or anything like it to succeed.

Mr. WELD urged the Directors to look after the little economies. He also referred to the expenditure on the Ponders End works, which last year the proprietors were given to understand were practically useless. The return on the electrical capital was also very small.

The CHAIRMAN, in reply, said in regard to rating he mentioned at the previous meeting that they had gone into the question of a re-assessment, and had obtained a reduction of 25 p.ct., which was equivalent to a saving of £3500 a year. In regard to Ponders End, the plant had worked itself right out. They had not intended to use these works again; but through the exigencies of the times, and the need for gas, they had to rebuild the works, which would now add materially to their productive power. The Board did pay attention to little economies; but as a gas engineer of long experience, he would say, "Don't produce economies by reducing expenditure on repairs and maintenance." Their electrical powers only extended to the area of Wood Green. But he considered that, remembering the war conditions, they had made considerable progress in developing the electrical

business. When the restrictions were taken off, there would, he believed, be a large increase in the use of electricity in the district.

The motion was unanimously carried.

THE DIVIDENDS.

The DEPUTY-CHAIRMAN (Mr. Henry Woodall) moved the declaration of dividends at the rates per annum of 5 p.ct. on the preference stock, of 4½ p.ct. on the "A" stock, and of 3 p.ct. on the "B" stock, all less income-tax. He remarked that all he could say about the resolution was that he wished the dividends were higher. The only consolation they had was that they were a little better than some of their neighbours. Had it not been for control, no doubt their dividends would have been better. But the Government had decided that gas companies were not to have anything like pre-war dividends as had been given to the railway companies; and the Company were now distributing all they were entitled to.

Mr. H. D. ELLIS seconded the motion, which was agreed to.

RE-ELECTIONS.

Moved by Mr. BAILEY, and seconded by the DEPUTY-CHAIRMAN, Sir Daniel Goddard was re-elected to his seat at the Board.

Proposed by the CHAIRMAN, and seconded by Mr. ELLIS, Mr. Woodall was also re-elected.

On the motion of Mr. CULL, seconded by Mr. INGLIS, Mr. John Eve was re-appointed one of the Auditors.

VOTE OF THANKS.

On the proposition of Mr. MICHEL, seconded by Mr. GEORGE BELL, a hearty vote of thanks was passed to the Chairman and Directors, to the Engineer and General Manager, the Secretary, staff, and employees generally.

The CHAIRMAN and Mr. BROADBERRY made acknowledgment for all included in the vote—Sir Daniel intimating, in the course of his remarks, that their colleague at the Board, Mr. J. W. Ford, was absent through indisposition.

BRISTOL GAS COMPANY.

Annual Meeting.

It was stated by the Directors in the report adopted at the annual meeting of the Company last Thursday that, in view of the abnormal conditions, the results for the year ended Dec. 31 were regarded as satisfactory. A dividend was declared for the half year at the rate of 5 p.ct. per annum. In order to provide for the large increases in the price of coal and oil, together with other charges connected with manufacture and distribution, and further increased labour costs, it was found necessary to advance the price of gas from July 1 last. Owing to war conditions, several contracts for repairs and renewals of works and plant have not been completed; and it has been deemed advisable to make provision for this deferred expenditure. Mr. Fenwick Richards expressed his wish to retire from the chairmanship, but retains his seat on the Board. Mr. James H. Howell has been elected to the chair, and Mr. George E. Davies to the vice-chair. Mr. Daniel Irving, who has, under medical advice, retired from the position of Engineer, after thirty years' service with the Company, is succeeded by Mr. R. Robertson, late Superintendent of the Canons' Marsh works, who has been connected with the Company for fourteen years.

The CHAIRMAN said that, at the end of the year Mr. Fenwick Richards intimated to his colleagues on the Board that he felt compelled to retire. They did their best to persuade him from this step; but he was resolute, and with great reluctance they accepted his resignation. The regret was mitigated to some extent by the fact that Mr. Richards was willing to remain on the Board, and continue to give them the benefit of his long experience as Chairman for six years and a member of the Board for 23 years. Another retirement had taken place during the year—Mr. Daniel Irving, who had carried out extensive and beneficial alterations to buildings and plant of the Company without a single mishap to life or limb. In his place the Board had elected Mr. R. Robertson, who was a distinguished gold medallist, and occupied a leading position in the gas engineering world. While dealing with these matters, he desired to express the thanks of the Board to the whole of the staff for their loyal service during a year of great difficulty and anxiety. Coal, though they had carbonized less, had cost them £21,000 more; and many other things had increased in proportion. The total expenditure was £586,086, as against £508,809 in 1917. On the other side of the account, their sales of gas had brought in £77,246 more. War allowances to men on active service had amounted to £8589. The number of their staff and workmen called up was 237; and of these 20 had made the supreme sacrifice. The price of gas had advanced from 2s. per 1000 c.ft. to 3s. 3d. to-day; but the average for 1918 was only 2s. 9¾d.—a figure which compared favourably with the charges of other companies. The make of gas went up between January and September of last year 73,837,000 c.ft., or 3 p.ct., as compared with the previous year; but from the time of gas rationing in September till Dec. 31, there was a decrease of 124,558 c.ft., or 12½ p.ct.—making on the whole year a decrease of 1½ p.ct. They were limited to a dividend of 5 p.ct. per annum on the ordinary stock, and to 4 p.ct. on the debenture stock. At this moment, when there was so much talk of profiteering, he should like to emphasize that they had on their books 2742 ordinary shareholders and 702 debenture holders, making a total of 3444; and of this number 45 p.ct. were holders of less than £200. No one, however unreasonable, could suggest that there was any profiteering when their dividends were limited to the amounts he had named, from which income-tax was deducted.

The Grantham and District Joint Trades Committee having protested to the Town Council against the price of gas, and called upon them to municipalize the gas, electricity, and water supplies, the Committee decided to refer the matter to a small committee for consideration.

CARDIFF GAS COMPANY.

It was pointed out at the annual meeting of the Cardiff Gas Company, last Tuesday, by the Chairman of the Board (Dr. Charles E. Dovey) that, while the coal bill had increased by £12,869. or 80 p.ct. over pre-war prices, and the wages bill was £36,922 over the pre-war figures (or 82 p.ct.), with all costs being more than doubled, the price of gas had only been increased by 24 p.ct.

In presenting the annual report, the Chairman said the receipts from the sale of gas showed an increase of 7½ p.ct. over the previous year; while fairly good increases had resulted from the sale of residuals. This had been accomplished in the face of many restrictions. The most extraordinary feature in the results was that, while less coal had been used, the total output of gas sold exceeded that of the previous year by 84 million c.ft. This excellent result was due to improvements in the process of manufacture, and reflected great credit upon the management. It was hoped to still further improve upon this achievement. An increase of 7086 tons in the sale of coke had been obtained, and the resulting ammonia compounds were satisfactory, though markets were restricted and prices governed.

They had paid £36,932 in wages above pre-war figures; while readily meeting the demand for increased wages on account of the increased costs of living. The increase of £12,869 in the coal bill was due to the 4s. per ton added since last year. They were unfortunately restricted to the purchase of Welsh coal, which was more costly by 2s. 6d. per ton than English coal; and while they had to pay nearly £14,000 a year extra, they did not get the rich carbonizing coal that the English gas makers were able to use.

To be able to meet the full dividends for 1918 they had had to lessen the reserve fund by £1073, as against £5853 in 1917. The Directors, however, felt that an increase in the price of gas ought to be allowed, beyond the present maximum of 3s. per 1000 c.ft. He considered that the Statutory Prices Act was not a fair measure; for while it gave power to increase the price of gas, it limited gas undertakings such as theirs to 3¾ p.ct. dividend on the ordinary stock, with no power to repay lost dividends out of future profits. Now the war was practically over, and the control of bye-products in a large measure removed, the Directors could not recommend the acceptance of the terms of the Statutory Prices Act. They proposed to make a strong effort to pull through; and to do nothing which would prejudice the capital interest of the shareholders. As Lord Moulton had admitted, the war could not have been successfully carried through without the supply by gas industries of the raw material for the manufacture of high explosives, and thus the sacrifice of profits had not been in vain.

The Chairman and Mr. R. H. Williams were re-elected Directors, and a hearty vote of thanks was passed to the Board, to the General Manager (Mr. Geo. Clarry), and to the Engineer (Mr. H. D. Madden).

PORTSEA ISLAND GAS COMPANY.

The Half-Yearly Meeting of the Proprietors was held last Thursday afternoon—Mr. R. E. HELLYER presiding.

The CHAIRMAN, in moving the adoption of the report and balance-sheet, referred to the resignation of Mr. J. D. Ashworth (the Engineer), who at the beginning of last November had a breakdown in health, and was ordered a prolonged rest. He was accordingly given three months' leave of absence; but subsequently, as his health would not permit him to resume his former responsibilities, he asked to be relieved of his appointment, and consequently retired at the end of the year. Mr. Thomas Carmichael, late Works Superintendent under the Nottingham Corporation, was first appointed Assistant Engineer; and after the retirement of Mr. Ashworth, to the senior position. The Company's business was still seriously hampered by the cessation of building operations; but notwithstanding this, 143 new accounts had been opened within the past year, bringing the total number of consumers up to 51,560. The total quantity of gas sold was 9 million c.ft., or 1·15 p.ct., only, less than during the corresponding period of the previous year, though the sales had been greatly affected by the Household Fuel and Lighting Order. Having regard to the increased prices of raw materials and labour, the items on the expenditure side of the revenue account showed a substantial increase, with the exception of coal and oil, where there had been a decrease of £1965. This was not in any way due to a reduction in the price of coal and oil, the cost of which was 6s. 8d. per ton and 4d. per gallon respectively in excess of 1917; but improved methods of manufacture had been adopted, which more than nullified the increased price of raw materials. The total wages showed an increase of £9958; but this did not represent the full effect of the advances which had been granted, as the last increase only came into operation in October. Sales of gas showed an increase of £30,871, due to additions to the charge—4d. per 1000 c.ft. from December, 1917, and a further 6d. from June, 1918. An economy was effected in the quantity of coke used, and better prices were obtained from residuals generally; the result being an increased revenue from this source of £4435. After payment of the usual interest charges, there remained £12,063 available for dividend, which would absorb £10,450, leaving £1613 to be carried forward. The Directors recommended dividends of 7⅛ p.ct. on the "A" and "B" shares, 6¾ p.ct. on the "C" shares, and 5¼ p.ct. on the "D" and "E" shares, which was equivalent to something less than 3 p.ct. on the amount at which the bulk of the shares had been purchased. Under the sliding-scale, the shareholders had had in consequence of the war to sacrifice £24,312; and during the same period the Company had paid to their employees in increased wages £68,313—£41,067 of which was paid during the past year. In conclusion, he acknowledged the invaluable services rendered by the officials during the exceptional stress and strain of the past few years, and the loyal devotion and untiring efforts of the superintendents of the various departments and staff generally, including the women workers, without whose assistance it would have been impossible for the Company to carry on.

The motion adopting the dividends recommended was carried.

SOUTH SUBURBAN GAS COMPANY.

The half-yearly meeting of this Company will be held next Friday, when the Directors will, *inter alia*, report: "The satisfactory settlement of an outstanding claim in respect of gas supplied for munition purposes justified the Directors in reducing the price of gas by 3d. per 1000 c.ft. as from the meter-readings for the Christmas quarter. The maintenance of this reduction, however, greatly depends upon the cost of coal and labour not being further increased." The net revenue account, as submitted, shows that, including the balance of £8510 brought forward from the previous half year, and after providing for debenture and other interest, the amount available for disposal is £43,867, out of which the Directors recommend a dividend at the rate of 5 p.ct. per annum on the preference stock, and (subject to authorization by the Board of Trade) of 3¾ p.ct. on the ordinary and West Kent ordinary stock—carrying forward to next year's account the sum of £21,971. The sales of gas showed a decrease of 12·26 p.ct., mainly due to the operation of the coal rationing scheme, "against the inequity of which the Directors unavailingly protested." The Bill promoted by the Company for the acquisition of the Dartford gas undertaking, and for other purposes, received the Royal Assent on Nov. 21, and has since been carried into effect. To commemorate the services rendered in the war by 459 of the Company's employees, of whom 54 laid down their lives, it has been decided to erect a memorial in front of the Livesey Memorial Hall; and a suitable design (prepared by Mr. Sydney March) is now in hand. The Directors have the satisfaction of reporting that the new co-partnership arrangements recently referred to in the "JOURNAL" have so far been completely successful from all points of view; and "relations with the Company's employees—always cordial—leave nothing to be desired."

METROPOLITAN GAS COMPANIES AND AUTHORIZED INCREASES IN PRICE.

At to-day's meeting of the London County Council, the Public Control Committee, in their report on their work during the three months to Dec. 31, say: We have considered applications made by Metropolitan Gas Companies to the Board of Trade for Orders under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, modifying the sliding-scale conditions so as to enable them to pay dividends on their ordinary stocks at three-quarters of the respective standard rate of dividends, notwithstanding that the price of gas would not otherwise permit the distribution of dividends at such rates. We made representations to the Board in each case, principally with a view to securing the insertion in the Order of a maximum price for gas. In the result, the Board has decided to make Orders in the undermentioned cases, fixing the maximum prices as indicated:

Company.	Maximum Price to be Charged for Gas.
Commercial Gas Company	4s. 2d. per 1000 c.ft.
Gas Light and Coke Company	4s. 4d. ,, ,,
South Metropolitan Gas Company	4s. 4d. ,, ,,
South Suburban Gas Company (in London area)	4s. 3d. ,, ,,

In the remaining case (of the Wandsworth, Wimbledon, and Epsom Gas Company), the Board refused to grant the application.

AIR-RAID DAMAGE TO GAS PROPERTY.

Experiences in London.

From the official reports of the London Fire Brigade, which are now available for Press notice, it is possible to indicate the nature of the damage sustained through bombs and anti-aircraft shells to the property of the three great London Gas Companies as a consequence of 25 enemy air-raids upon London, which took place between May, 1915, and May, 1918. In more than one-half the raids, damage to mains or other property of the Companies was caused; and in many of the reports mention is made of a quantity of gas being destroyed. The following items have been extracted from the reports, taking the three Companies separately.

Gas Light and Coke Company.

September, 1915: Farringdon Road, E.C.—a street lamp shattered.

October, 1915: Chancery Lane, W.C.—20 ft. of main shattered. Wellington Street, Strand—8-in. and 12-in. mains broken. Finsbury Pavement, E.C.—20 ft. of 8-in. main shattered.

July, 1917: Queen Street, Cheapside—main broken.

September, 1917: Victoria Embankment—main damaged by breakage in subway. Edgware Road—windows broken at Company's premises.

September, 1917 [second raid]: Southampton Row, W.C.—4 ft. of 8-in. main damaged. King Henry's Road, Hampstead—a street-lamp damaged.

September, 1917 [fifth raid]: Swain's Lane, Highgate—main broken.

October, 1917: Grosvenor Bridge of the London, Brighton, and South Coast Railway—three 21-in. mains broken. South Eaton Place, Belgravia—5-in. main broken. Laburnum Street, Hackney Road—damage to buildings covering an area of 300 ft. by 200 ft., used by the Company as workshops, motor garage, offices, and stores.

December, 1917 [second raid]: Brownlow Street, Holborn—12 ft. of 6-in. main smashed. Lyall Street, Belgravia—4-in. main broken.

January, 1918: Abbey Road, St. John's Wood—5-in. main broken. Savoy Hill, Strand—main damaged. Bedford Place, Holborn—12 ft. of 6-in. main damaged.

May, 1918: Morning Lane, Hackney—6 ft. of 4-in. main smashed.

South Metropolitan Gas Company.

September, 1915: Keeton's Road, Bermondsey—6 ft. of a main shattered. Childeric Road, Deptford—broken main. Kingsman Street, Woolwich—main shattered.

June, 1917: Linden Grove, Peckham—main broken.

July, 1917: Harris Street, Camberwell—main smashed. Spa Road, Bermondsey—4-in. main broken.

September, 1917 [third raid]: Marcia Road, Bermondsey—4-in. main fractured.

December, 1917: Blackheath Park—4-in. main damaged.

January, 1918: Upper Kennington Lane, Vauxhall—a building of two floors, 250 ft. by 60 ft., used as a retort-house, was damaged by explosion and fire; a building of two and three floors, about 50 ft. by 40 ft., used as a laboratory, office, and dining rooms, and the contents, damaged by breakage and dirt; a building of two floors, about 60 ft. by 50 ft., used as offices, had window glass broken. Wandsworth Road—a building of three floors, about 80 ft. by 40 ft., used by the Company as engine rooms, machine rooms, and stores, damaged by explosion.

May, 1918: Verney Road, Old Kent Road—7-in. main damaged.

Commercial Gas Company.

September, 1916: St. Leonard's Street, Bromley, E.—a number of service-pipes destroyed. Poplar—12 ft. of 6-in. main injured.

September, 1917: Southill Street, Poplar—9 ft. of main fractured.

BELFAST PUBLIC SERVICES "HOLD-UP."

Gas-Works under Military Supervision.

The continuance of the Belfast shipbuilders', engineers', and electricians' strike, as resolved upon by a substantial majority on a ballot vote last week, when the shipbuilding firms' offer to deal with the 44-hour week demand on a national basis if work were resumed, added to the gravity of the situation with regard to the municipal services—gas and electricity supplies and tramways—which had been held up from the beginning of the upheaval three weeks before with, of course, very serious detriment to industries, large and small, and causing inconvenience to the people of all sections. During the week, a strenuous controversy arose, in the course of which the Lord Mayor (Mr. J. C. White) and Corporation were openly accused of having bargained with the strikers for withholding gas and electricity facilities from general consumers, on the understanding that these would be granted to hospitals and charitable institutions. The Lord Mayor denied the allegation, and explained that the civic authorities were not to blame; his contention being that it was the duty of the Executive Government, under Lord French as Viceroy, to have ensured that the public services were maintained.

With the adverse vote referred to aggravating the situation, the Lord Mayor addressed a proclamation to the citizens asking for volunteer workers to assist in the restoration and working of the services, assuring those responding that they would receive adequate protection.

Strong parties of military were placed at the disposal of his Lordship, and they took possession of both the gas-works and the electrical power-house, and the various outside properties connected with these. It was decided that the military guards will remain on duty until normal conditions are restored. The general feeling at the week-end was that the services would be in operation again without much delay; and that the usual industrial round would then proceed—apart, of course, from the shipyard and other centres where the strike fever is unabated.

It should be mentioned that early last week, on the strength of the agreement of the men's representatives and the terms of the shipbuilding firms' proposals to be submitted to the ballot, the municipal authorities thought they might re-start the supplies of gas and electricity. This was done; while the tramway service was partially resumed. The strike leaders and the men very quickly resented this action; and deputations went to the gas-works and the electrical station and compelled those in control to again shut down. The gas-works authorities were fortunately able throughout the whole strike period to maintain manufacture, so that supply could be resumed at short notice; but the loss in respect of the respective services makes a very high estimate, and will have serious effects on the finances of the undertakings. While many householders had a brief restoration of gas illumination after the conference on the proposals, the citizens generally had to rely on oil-lamps and candles.

A message from Belfast on Sunday stated that, following upon the Lord Mayor's action and the assistance rendered by the military, the shops were illuminated on Saturday night; and the theatre and picture houses had re-opened. Many industrial establishments were enabled to resume operations—a full supply of gas and electricity being available.

No Coal at West Calder.—On inquiry being made as to the cause of a failure one morning of the gas supply at West Calder, it was found that there was no coal at the gas-works. All engines were stopped; but a supply was secured for lighting in the evening. On the following day, much inconvenience resulted to consumers from another failure owing to lack of coal.

Price of Gas at Busby.—The Busby and District Gas Light Company have applied to the Board of Trade for power to increase the dividend on their capital by raising the price of gas. The application has been considered by the Busby and Clarkston Lighting Committee, who estimate that, if the request is granted, the cost of public lighting will be advanced from 8s. 4d. to 12s. per 1000 c.ft. In the circumstances, though the lighting restrictions have been removed, the Committee have decided to light only a few additional street-lamps.

NOTTINGHAM GAS FINANCES.

Some interesting information regarding the financial position of the Nottingham gas undertaking is embodied in the report of the City Auditors (Mr. Walter Gath and the late Mr. T. C. Leman) which has just been presented to the Corporation—the report having been agreed to prior to Mr. Leman's death.

The consolidated stock and loans in connection with the undertaking are represented by £1,036,495; the gross profit for the past year having been £123,662, or 11·93 p.ct. on the capital. Interest absorbed £50,891. The sum of £30,000 was allocated during the year in relief of rates, and £42,770 set apart to reserves. The accumulated reserves or surplus total £716,037. The capital expenditure on the undertaking amounts to £1,184,652. The revenue account shows receipts of £453,449, made up of £322,937 derived from sales of gas, £125,077 from residual products, and £5434 from sundries. The expenditure during the year was £329,786; the principal items going towards making up which were £241,687 for the manufacture of gas, £39,536 for distribution, £36,578 for rent, rates, and taxes, and £10,983 for management. The net revenue being £18,305 more than in the previous year, the income is equal to 4s. 0·48d. per 1000 c.ft. of gas sold, an increase of 0·59d. on the previous year. The expenditure is equal to 2s. 11·26d. per 1000 c.ft., a reduction of 0·51d.; the profit consequently showing an increase of 1·10d. per 1000 c.ft. The cost of production has been: Total expenditure 2s. 11·26d., less sales of residuals and sundries 1s. 1·95d., or a cost per 1000 c.ft. sold of 1s. 9·31d., or 0·11d. more than in the previous year.

The comparison with the previous year is: Increased income—Sales of gas, £33,540; residual products, £6263—total, £39,714; less decreased sundries, £2358—leaving £37,856. The increased expenditure during the year was represented by £32,386; the chief item being increased cost of manufacture £28,721; less decreased expenditure £13,285 (principally made up of decreased rent, rates, and taxes £13,254)—leaving the total increased expenditure £19,051, and bringing the increased revenue down to £18,305. The total revenue last year was £123,662, compared with £105,357 in 1917, or an increase of £18,305. The balance of revenue, totalling £157,418, was subject to deductions, which left £95,447. This has been thus disposed of: In aid of general district rate, £30,000; to renewal fund, £30,000; to reserve fund, £5000; carry forward, £30,447.

HASTINGS ELECTRICITY CHARGES AND DEFICITS.

The Corporation Way and the Better Way.

The Hastings Electricity Committee and the Corporation are always anxious to put the best possible complexion upon the financial affairs of the electricity undertaking. It badly requires all it can get in this way; but the unfortunate part of it is the ratepayers do not realize all that the carefully prepared movements mean. Their design, of course, is to make the financial position look better than it is; but in the end this does not find expression in the lump sums of deficit which are constantly occurring.

There are two little paragraphs in the "Hastings Observer" report of a recent meeting of the Corporation, which are worth giving. The first refers to the increase of the charge for public lighting; the second to the Statutory Undertakings (Temporary Increase of Charges) Act. The first says;

> The Electricity Committee recommended that, as a temporary measure, having regard to existing conditions, the charge for current actually supplied for lighting of the public street-lamps as from the date when the order was recently given for the re-lighting of the lamps, be at 3d. per unit instead of the existing charge of 2d. per unit, with an addition to the amount of the account rendered of 20 p.ct. Councillor Hill moved the adoption of the report, which he said was a temporary measure to put the electric light on the same footing as gas. Alderman Hocking seconded. Councillor Dr. Gray asked why the price to private consumers had not been put up. Councillor Hill said that the maximum had been reached already in the department. In reply to Alderman Chesterfield, the Town Clerk said the effect would be that the charge would be 3d. per unit.

The second paragraph states—

> The Sub-Committee appointed by the Council on Jan. 4, 1918, to deal with the opposition to the Bill promoted by the Hastings Gas Company in the 1918 session of Parliament, to give temporary relief to the Company in respect of the statutory restrictions as to their standard rate of dividend, and for other purposes, reported that the petition against the Bill, ordered to be sealed by the Council on Feb. 1, 1918, was duly deposited. The Committee proceeded to give an exhaustive review of the subsequent proceedings, which led up to the general result that the Gas Company's case might be said to have failed, and that it was only the smaller and weaker provincial companies who would secure any benefit from the Statutory Undertakings (Temporary Increase of Charges) Act, 1918. Full justification might be claimed for the action taken resulting in securing an equitable and satisfactory settlement of the question on behalf of the consumers. The local expenses in connection with the opposition totalled £183 14s. 4d. Attention was drawn to the fact that the Act is applicable to the electricity undertaking of the Council, and certain recommendations with regard to the testing of gas had been made to the Public Lighting Committee. Adopted.

Commenting on these reports, Mr. C. F. Botley, the Engineer and General Manager of the Hastings and St. Leonards Gas Company, writes:

Hastings Electricity.

Sir,—I am sending a marked copy of the "Hastings Observer." You and your readers are sufficiently interested in this matter for me to feel justified in troubling you with one or two facts again. You will observe the Committee, in reporting on what they consider the successful opposition to the Financial Hardships Bill, regard the arrangement whereby the bulk of our shareholders would be receiving £2 12s. 6d. p.ct. as the result of the Government Bill, as an equitable one; but you see they point out that the Bill is applicable to the electricity undertaking.

The maximum in the Provisional Order is 8d.; and as about two years ago a war time advance of 20 p.ct. was made, the flat-rate of 6½d. for lighting becomes as near as possible 8d. They therefore make use of a half-truth, and say that the maximum has been reached, whereas as a fact they are selling a very large proportion of the current at figures under such maximum. For instance, for the last year only 40 p.ct. was sold at the top rate, 32 p.ct., in fact, being sold for power, &c., at 1½d. *plus* 20 p.ct. They could therefore immediately rectify the financial position without an Order from the Board of Trade; and they could re-impose meter-rents, which they abandoned quite recently.

Owing to the presence of troops in the town, the deficit last year (as perhaps this year) was not as great as anticipated; but very considerable provision was made in the estimates for losses, instead of, as would be the case of any commercial undertaking, and as we hold should have been done, in increasing the charges to consumers. You have had the figures before; but the deficits for the last three years have been £5786, £5258, and £4628.

Regarding public lighting. This, as you know, is the "goose that lays the golden eggs;" and it accounted for one-third of the revenue in pre-war days. In the revenue account, as you quite well know, on one side is given the expenses against public lamps, and on the opposite side the income. Thus deducting the expenses from the income, and ignoring extraordinary charges, it should give the cost received for the current alone. On this basis, I have analyzed the figures for many years past; and prior to 1917 I find the charge per unit varies from 3·44d. down to 2·36d., which was in 1916. In 1915, it was 3·04d.

The paper report, as well as the actual *agenda* of the Council, is ambiguous; but it appears the fact that it is intended to increase the charge for current for public lamps from 2d. with the 20 p.ct. increase, to 3d. net. I am somewhat puzzled as to what help this is going to be to the undertaking, especially as compared with pre-war days; and I very much doubt as to the actual charge of 2d. per unit.

You will see the reason given for increasing the figure is to compare with gas, but why should there be one comparison for gas for public purposes and gas for private purposes. Gas has been increased 52 p.ct. all the way round; but, as you will perceive, the suggested position is, public electricity is to be increased from 2d. to 3d., or 50 p.ct., but private electricity only 20 p.ct.

In 1918, the quantity of electricity sold for public lamps was only 13,928 units, for which a charge of £122 2s., *plus* 20 p.ct., was made. This I make is 2·52d. per unit. Now, 2d., *plus* 20 p.ct., is really only 2·4d.; so that the increased charge is only 0·6d.—not much of a help to a deficit of £4000 or £5000 a year, and from the same pockets. At the present time, 1d. in the pound on the rates is £1400 or £1500.

GAS CONUNDRUMS AT WORTHING.

The following questions were addressed to the Chairman of the Finance Committee of the Worthing Town Council by Councillor Jackson:

1.—Is the Chairman of the Finance Committee aware that gas undertakings in the London district have made the cessation of hostilities the occasion for reducing the abnormal price charged for gas?

2.—Is he aware that the Worthing Gas Company have made the same circumstances the occasion for raising the price of gas?

3.—Is he aware that in many cases such notices of increase were served in the New Year, several days after the meters had been read for the Christmas quarter, thus giving the consumer no option of discontinuing the use of gas at the increased price?

4.—Will the Chairman, under these circumstances, and in view of the importance to the burgesses, and the Council in particular as consumers for lighting, power, and National Kitchens, say if notices served late as described are valid and enforceable at law? and if the Finance Committee will consider the desirability of taking steps to protect the interests of the burgesses, both as ratepayers and consumers?

Alderman Denton replied that, as Chairman of the Finance Committee, he had no knowledge of the matters referred to in the questions; but he would see that they were brought before the Finance Committee at their next meeting.

The Finance Committee have since reported that the Town Clerk wrote to Mr. S. O. Stephenson (the Engineer and Manager of the Gas Company) for the information asked for by Mr. Jackson; but, owing to Mr. Stephenson being ill and away from business, the information required had not been received. The Committee deferred consideration of the matter pending a reply.

PIGS ON A GAS-WORKS.

Complaints in the Goole Urban District Council.

At the Monthly Meeting last Friday of the Goole Urban District Council, there was a discussion on the condition of the gas-works, the subjoined report of which is taken from the "Eastern Morning News."

The CHAIRMAN (Mr. F. B. Glew) stated that last week, along with other members of the Council, a visit was paid to the gas-works; and in the course of this the governor-house was inspected. In the building was machinery of a very delicate character, which had cost the town hundreds of pounds. He was surprised to find the place had been used for the storing of pig potatoes, and in the preparing of them for pig food. The whole of the valuable machinery had been ruined beyond redemption. In fact, he had never seen such a mess in all his life;

and he thought it was time someone spoke out, and put an end to the matter. He thought it was not in the interests of the town that on the Council's property piggeries should have been erected. On the day of the visit there were seventeen pigs in the yard, and poultry and rabbits out of number. He also wished to protest against the condition of the lamps that had been stored, as all of them appeared to have been smashed. If what he saw on the day of his visit was a sample of gas-works management, it was no wonder that the price of gas had reached the limit of 5s. per 1000 c.ft.

Mr. L. W. NUTTALL (the Gas Manager) said the Council gave permission to an employee to keep pigs. He considered the governor-house to be in no worse condition than it was when he came to Goole. It was in working order. They all knew the gas-works; and as regarded the condition of part of the place, he himself was ashamed of it. He denied that potatoes had been cooked in the governor-house.

The CHAIRMAN: I myself have seen steam coming out of the place as a result of the cooking.

Mr. NUTTALL said, in regard to the lamps, that the Council expressly ordered them to be taken off the streets when they knew there was no proper place to store them. Most of them had been smashed in the streets.

Mr. S. G. BEVAN and Mr. R. C. BICKERTON both stated that they were very disappointed at the conditions at the governor-house; the former saying the machinery was only fit for the scrap-heap.

Mr. BLYTH said it was an impossible position for a servant of the Council to keep pigs on such a scale, and at the same time look after his own work. Such a practice was wrong in principle, and showed bad management. He thought the man should be told to get rid of the pigs within a reasonable period of time.

The matter was then referred to committee.

A Fairly Good Year at Weymouth.—Next Thursday the shareholders of the Weymouth Consumers Gas Company will meet to receive the Directors' report for the second half of 1918. The sale of gas during this period was 84,197,500 c.ft., or 1,902,600 c.ft. (equal to 2·2 p.ct.) less than in the second half of 1917—a decrease "doubtless attributable to the extra care and economy practised by the consumers under the stimulus of the Household Fuel and Lighting Order." The coal supplied to the Company, although costing more, did not produce such good results as those hitherto obtained; and a larger quantity had consequently to be used to manufacture less gas. After meeting the fixed interest on the debenture stock, the balance of the net revenue account is £9340, out of which the Directors recommend a dividend on the ordinary stock at the maximum rate of 5 p.ct. per annum. During last year the quantity of gas sold was 165,681,400 c.ft. or an increase upon that brought to book for the year 1917 of 6,051,000 c.ft.—3·79 p.ct. There is now being installed at the works a water-gas plant as an auxiliary to the coal gas plant. The work is well forward, and it is hoped will shortly be completed.

MAXIMUM PRICES OF PETROLEUM PRODUCTS.

The Board of Trade have made an Order prohibiting the sale, delivery, or supply of specified petroleum products at prices exceeding those named. So far as gas oil and fuel oil are concerned, the Order is in these terms:

GAS OIL.

	Per Gallon.
In bulk, *ex* wharf	8½d.

For delivery in barrels, *ex* wharf, 3½d. per gallon additional.

FUEL OIL.

	Per Ton.
In bulk, *ex* wharf	£7 10 0

For delivery in barrels, *ex* wharf, 3½d. per gallon additional.

Orders &c., revoked are the Petroleum Products (Wholesale Prices) No. 2 Order, 1918; Petroleum Products (Contracts) Order, 1918; Petroleum Product (Wholesale Prices) No. 3 Order, 1918; Petroleum Products (Wholesale Prices) No. 4 Order, 1918; and the notice dated Dec. 18, 1918, issued under the Petroleum Products (Wholesale) Prices Amendment Order, 1918.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Feb.* 17.

So far as pitch is concerned, makers are still very well sold for this half year, and the price remains at not under 65s. net per ton f.o.b. manufacturers' works. Ships are unfortunately experiencing delay in some French ports; and this, of course, results in a reduction of the possible number of voyages. Benzol for motor purposes is going steadily into use; the article being free from regulations, which were an impediment to this trade. Solvent naphtha seems not to interest anyone at present; and the price is nominally about 3s. net per gallon. Creosote is in considerable request, and business is reported at about 6½d. net in bulk at producers' works.

There is nothing new to report as to sulphate of ammonia.

Tar Products in the Provinces.

Feb. 17.

The average values for gas-works products during the week were: Gas-works coal tar, 34s. 6d. to 39s. 6d. Pitch, East Coast, 45s. to 47s. 6d. per ton f.a.s.; West Coast—Manchester 45s. to 46s., Liverpool 45s. to 46s., Clyde 45s. to 46s. nominal. Benzol 90 p.ct., North,

USE Simmance's

DEAD BEAT INDICATORS

instead of WATER-TUBE GAUGES and

"READ THE PRESSURE BY THE POINTER."

No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.

Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

Incorrodible, Accurate, for foul or purified gas.

MADE IN MANY RANGES WITH TABLETS LETTERED AS DESIRED.

ALEXANDER WRIGHT & CO., LTD., WESTMINSTER.

Agents: Australia—FYVIE & STEWART, 360, Collins St., Melbourne; Canada—W. P. ROPER, 502, Merchants' Bank Building, Montreal.

1s. 9d. to 1s. 11d.; 50-90 p.ct., naked, North, 1s. 10d. to 1s. 11d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. 6d. to 2s. 7d. Heavy naphtha, North, 2s. 10d. to 2s. 11d. Creosote, in bulk, North, 5d. to 5½d. Heavy oils, in bulk, North, 6d. to 6½d. Carbolic acid, 60 p.ct., about 1s. 6d. Naphthalene, £20 to £25; salts, £6 to £7, bags included. Anthracene, "A" quality, 4d. to 6d. per minimum 40 p.ct.; "B" quality, 1½d. to 2d.

FROM A MARKET CORRESPONDENT.

Tar Products.

There is very little alteration in quotations of tar products; but, unfortunately, labour troubles continue to have a marked effect upon outputs. Should the threatened strike of coal miners take place, the result would be almost disastrous from the point of view of bye-product producers, inasmuch as several products are already finding a satisfactory peace time outlet. The production of dyes would be interfered with, which, in turn, would create difficulties in the textile industries. Pitch continues very firm on the maintained improvement in the shipping position. Provincial values have not altered, although these district stand to benefit even more than London from the improving shipping situation. Tars are selling well; there being good inquiry from local authorities for road-making purposes. Nothing is being done in carbolic acid, and prices are practically unquotable. There is a good demand for creosote, and quotations are gradually creeping up. Solvent naphtha is quiet, and prices seem to have reached bottom. Heavy naphtha and crudes remain firm. Refined naphthalene is steady at late rates; crudes are a trifle lower. Toluol finds a ready market for dye making; and the fact that benzol can be bought for any purpose without licence is bringing about free sales of this product. At a meeting of producers of crude and refined benzol last week, it was resolved to support the formation of the National Benzol Association for the purpose of standardizing benzol for motor spirit, and carrying on research and investigation with a view to improving the suitability of benzol for motor or any other spirit. Anthracene is rather better; but other products are without change.

The range of quotations is as follows.

Benzol: 90% London, 2s. 3d. to 2s. 6d. per gallon; 50-90%, 1s. 9d. to 2s. 3d. per gallon.

Carbolic Acid: Crude 60's 1s. 6d. per gallon; crystals 40% 1s. per lb.; pale liquid 98-99 p.ct., 3s. 8d. per gallon.

Crude Tar: London 40s. to 41s.; Midlands 34s. to 36s.; North 35s. per ton *ex* works.

Pitch: London, 67s. 6d. to 70s. per ton; East Coast, 45s. to 46s. per ton; West Coast 43s. to 44s., with Manchester 42s. per ton and Glasgow 47s. 6d. per ton; South Wales, 55s. per ton.

Solvent Naphtha: London 3s. to 3s. 3d. Provinces average 2s. 9d. per gallon.

Crude Naphtha: Naked 1s. 1d. per gallon.

Heavy Naphtha: 2s. 9d. per gallon.

Naphthalene: **Refined £28** per ton nominal; crude £7 to £13 10s. according to quality.

Toluol: Naked, 2s. 9d. to 3s. per gallon nominal.

Creosote: London 5½d.; North 4¾d.; heavy oil, 7d. per gallon in bulk.

Anthracene: 40-45%, 4½d. to 8d. per unit per cwt.

Grease Oils 18° Tw. (naked) £6 per ton f.o.r. makers' works.

Aniline Oil: 1s. 2d. per lb.

Cresylic Acid: 95% 2s. 9d. to 3s.; 97-99% 3s. to 3s. 3d. *ex* works London; f.o.b. other ports.

Sulphate of Ammonia.

Beyond the fact that outputs are jeopardized by reason of the labour troubles, the position as regards the home trade is without change. There is a good export inquiry; but very little can be done until restrictions are modified or removed altogether. Agricultural crops are backward after the spell of hard weather, and the farmer is anxiously seeking artificial fertilizers. Chilian nitrate at the Government price of £20 per ton, comparing with £11 or £12 per ton before the war, is not very attractive; and preference is consequently given to sulphate of ammonia. Prices will remain unchanged until May 31 next, and buyers will not benefit by delaying orders—indeed, delay in ordering may mean inability to procure supplies in time.

The Auer Lighting Company.—The "Ironmonger" of Feb. 8, in their column of "German News," said: The electric-lamp factories of the Auer (Welsbach) Company at Berlin are now carried on under the style of the "Osram Works," while the Company's works for the manufacture of incandescent mantles, lighting bodies, and glassware for heating and lighting by gas and electricity have been converted into a separate Company under the style of Auerlicht Gesellschaft.

Yorkshire Gas Power and Bye-Products Company, Ltd.—The "Iron and Coal Trades Review" states that, according to the draft prospectus of the Yorkshire Gas Power and Bye-Products Company, Ltd., the Company are to subscribe for £75,000 of debenture stock of the Holmes & Jordan Colliery, Ltd., which, in return, will guarantee the first year's dividend of the Yorkshire Gas Power and Bye-Products Company. The latter have a share capital of £700,000, divided into 550,000 cumulative participating 8 p.ct. preference shares of £1 each, and 150,000 ordinary shares of £1 each. The Directors are Mr. H. Steel (Chairman of Steel, Peech, and Tozer), Chairman; Sir Cecil Partridge, Managing; Mr. K. P. Hawksley (Director of the South Metropolitan Gas Company); and Mr. F. D. Marshall (Past-President of the Institution of Gas Engineers). The Secretary is Mr. A. E. Madeley, with offices at Southampton House, High Holborn, W.C.1.

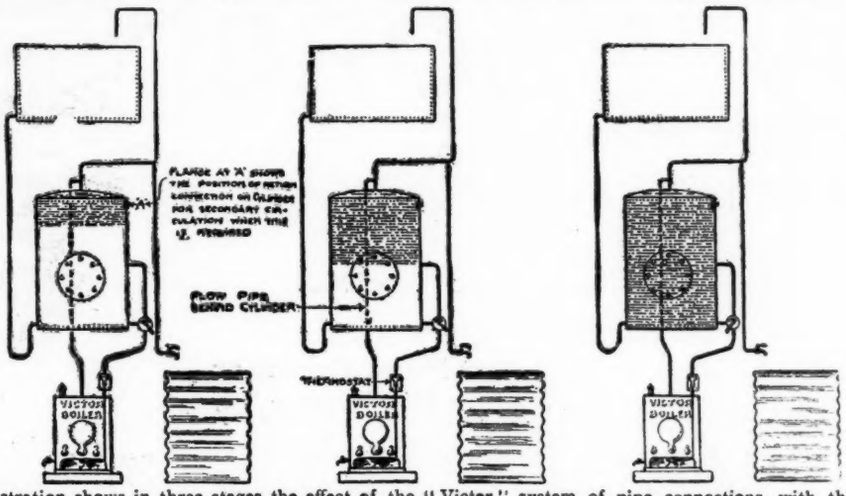
Oven Furnaces constructed and Fired on the
DAVIS Patent
Revergen
(Regd. Trade Mark)
PRINCIPLE
Show a Saving in Gas Consumed of 33⅓%
As compared with any other known system of Oven Furnace Firing with Town's Gas.
PROOF BY DEMONSTRATION ARRANGED—PAMPHLET GRATIS.
The Davis Furnace Company (Propts.: The Davis Gas Stove Co., Ltd.), Diamond Foundry, Luton

THE ORIGINAL "CUT-OUT-VALVE" IDEA

(PATENTED).

GAS-HEATED HOT WATER SUPPLY FOR DOMESTIC PURPOSES.

Example of the VICTOR system of Gas-Heated Hot Water Apparatus in circulation.


FLANGE AT 'A' SHOWS THE POSITION OF RETURN CONNECTION ON CYLINDER FOR SECONDARY CIRCULATION WHEN THE U. REMOVED
FLOW PIPE BEHIND CYLINDER
THERMOSTAT
VICTOR BOILER
VICTOR BOILER
VICTOR BOILER

This illustration shows in three stages the effect of the "Victor" system of pipe connections, with the cut-out valve. Under this arrangement the contents of the cylinder heat from the top, storing the water at the temperature at which it circulates from the boiler, viz., about 150 deg. Fahr. This enables a small supply to be obtained for the sink, heating a few gallons, and shutting off the gas, supposing no further demand exists for the time being.

Working from left to right, the illustrations show the action of drawing water as it should occur, the cold entering the bottom of the cylinder and following the hot water until the whole is exhausted. The cold water should not be allowed to mix with the hot in delivery.

A special feature of Potterton's system is the ability to place water by this means in the storage cylinder at the desired temperature within a few minutes of lighting the gas, *i.e.*, the water having to circulate through the boiler once only. Not only is the supply obtained more quickly by this means, but losses by radiation are cut down also.

The Cut-out Valve fitted in the lower return connection controls the circulation of the lower half of the contents of the cylinder, so that a reduced supply can be held in reserve when baths are not in demand, with economy in gas consumption.

THOMAS POTTERTON, HEATING SPECIALIST, **Cavendish Works, Balham, LONDON.**

Wright's "Compact Eureka" Gas-Cooker,

with extra large Hotplate and "Lewis" Patent Plate-Rack and Backplate. The latter folds down flat when not in use.

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NOW is the time to bring to the notice of Housing Authorities, Architects, Property Owners, Estate Managers, Builders, &c., the advantage and economy of Gas-Heated Apparatus for meeting the entire domestic needs of

COOKING, WARMING, and HOT-WATER

Supply. We shall be pleased to co-operate and assist you with information and practical suggestions if you will communicate with us.

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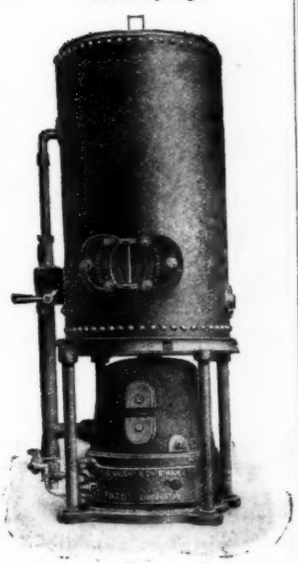
Hot-Delivery Pipe.



Wright's "B.T.U." Combined Hot-Water Circulator and Storage-Tank,

with Patent "Thermostat" and new "Economy" Valve. Supplied on High or Low Stand.

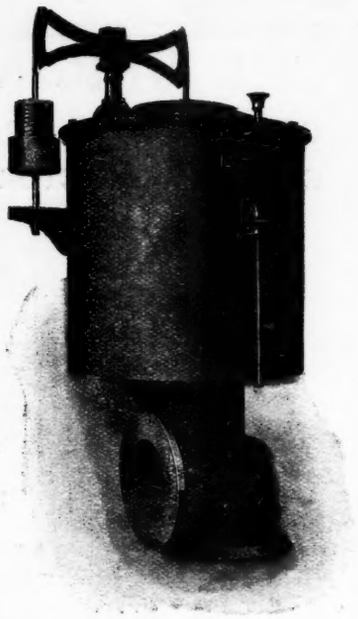
BRADDOCK'S RETORT-HOUSE GOVERNORS

HAVE PROVED TO BE

SECOND TO NONE.

Many repeat orders have been received.

Braddock's New Patent Retort-House Governor is a further improvement and is especially desirable for use with Vertical Retorts.



No. 310.
Braddock's New Patent Enclosed Retort-House Governor.
Latest Type.

Further Particulars upon Application.

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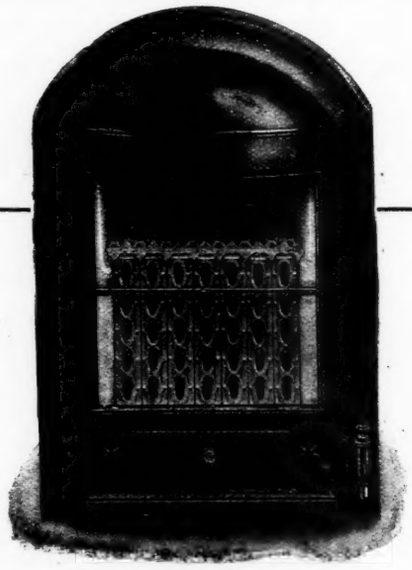

No. 590. PATENT "STELLA" GAS FIRE.

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Cashel Gas-Works to be Leased.

After discussion, the Cashel (co. Tipperary) Urban Council resolved to ask for proposals for the leasing of the gas-works for a term of years. The Council had previously decided to shut-down the works and discontinue the manufacture of gas; but a meeting of ratepayers appointed a deputation to urge that something should be done to maintain the proper lighting of the town. When the deputation presented themselves, Mr. D. R. O'Leary, who had acted as Secretary of the ratepayers' meeting, read correspondence showing that Messrs. Wallace Bros., coal merchants, of Dublin, were anxious that the works should be kept going, but that they could not send coal without the Controller's order. Another speaker conveyed the wishes of the ratepayers, and reported an interview which he had had with Mr. Wallace, who told him he could not understand how it was the gas-works could not be run at a profit, and offered to take them on lease. The price of gas in Cashel used to be 5s. or 6s. per 1000 c.ft., but now, owing to the Council's finances and the abnormal condition of the times, they had agreed as ratepayers to pay 10s. He understood Mr. Wallace was willing either to pay a rent for the works or to buy them; and he did not seem to think a proposal to light the town free in consideration of being leased the plant an unreasonable one. Mr. J. O'Connor said it would be very irregular for the Council to consider only one application. The matter should be open to competition. Mr. Hanley intimated that he would give £100 to supply coal for a month. The suggestion for open competition was then agreed to; and Mr. Hanley handed over a cheque for the amount named, while Mr. Ryan offered 5 tons of coal at the current price.

Ballymena Gas-Works.—The Ballymena Urban Council have decided to obtain the opinion of Mr. J. D. Smith, the Engineer of the Belfast Corporation Gas-Works, as to the condition of the gas-works—particularly in respect of retorts—and as to the desirability of the Council embarking on a scheme of electric lighting.

Gas Shortage at Maltby.—The Rotherham Rural Fuel and Lighting Committee had before them at their last week's meeting a report by Mr. Dunn on the shortage of gas at Maltby owing to the failure of the local Gas Company to obtain sufficient supplies of coal. Great inconvenience was being caused thereby. It was resolved that the Secretary write to the Coal Controller asking him to put in force the priority supply regulation.

Bromsgrove Gaslight and Coke Company.—Mr. I. Green presided at the annual meeting, when accounts were submitted which showed a profit of £1963, and £2086 was brought forward. A dividend of 10 p.ct. on the original shares was recommended, and 7 p.ct. on the "B" shares, for the year, with £2407 to be carried forward. The Chairman stated that the increased expenditure in coal, wages, and rates and taxes during the year amounted to £1637; and the sum received for the sale of gas and residuals was only £1375. The report was approved.

Uckfield Gas Supply Restricted.—Owing to the shortage of coal, the Uckfield Gas Company have found it necessary to turn off the supply of gas from 9 p.m. to 6 a.m.

Gas-Works for Las Palmas.—It is reported in the "Journal des Usines à Gaz" that steps are being taken in the direction of erecting a gas-works at Las Palmas, where at present, so it is stated, there is none.

Electricity Extensions at Oldham and Bury.—Electrical plant extension schemes are under contemplation at Oldham and Bury; and questions of finance in connection therewith were considered at the last meetings of the Town Councils. At Oldham, the Town Council adopted a recommendation of the Electricity Committee to apply to the Local Government Board for permission to borrow £150,000 for the purpose; and at Bury it was decided to make application for authority to borrow £94,000.

Stocks of Metals.—In order that the trade may know the position in regard to stocks of the important metals, the following particulars are published of the stocks (exclusive of old metal and scrap) in this country in the possession of the Minister of Munitions, on Feb. 1: Copper, 41,882 tons; spelter G.O.B., 23,905 tons; spelter refined, 7734 tons; aluminium, 13,092 tons; soft pig lead, 86,493 tons; nickel, 2388 tons; antimony regulus, 3731 tons. It is intended to publish at monthly intervals the stocks held on the first day of each month. In addition to the above, the Minister holds large quantities of scrap, mainly brass, of which it is impossible to give any particulars at present.

Drogheda Gas Supply.—At a meeting of Drogheda Corporation, Alderman Elcock complained of the quality of the gas supplied. Alderman Lyons added that there were complaints from the printing offices and bakeries; and the Gas Manager (Mr. H. W. Saville) told them the bad quality was due to inferior coal. In the opinion of Mr. Callan, when incandescent burners were used the light was good; but Mr. Stanley observed that for heating purposes the gas was not 50 p.ct. as good as it used to be. The Mayor (Mr. M. M'Gowan, J.P.) thought the discussion irregular, and pointed out that Mr. Saville was not present. He undertook, however, to call a meeting of the Gas Committee to go into the whole matter.

East Greenwich Gas-Works and the Silvertown Explosion.—According to the official report on the explosion and fire which occurred at the munition works of Messrs. Brunner, Mond, & Co., at Silvertown, on Jan. 19, 1917, 69 people lost their lives, and 72 were seriously injured. The explosion caused widespread damage. Not only were the munition buildings destroyed, but warehouses and other property, covering an area of about three-quarters of a square mile, were seriously damaged. Many alarm calls on the brigade were made; one of the earliest relating to an outbreak of fire which occurred at the South Metropolitan Gas-Works at East Greenwich. A very large quantity of gas was destroyed; and No. 2 holder was severely damaged, and collapsed.

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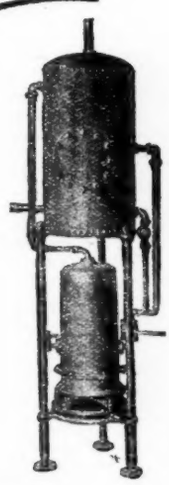

Increased Sales at Derby.

At the Ninety-Ninth Annual General Meeting of the Derby Gas Light and Coke Company last Friday, Alderman J. W. Newbold, the Chairman, said the Company had only carried on in circumstances of great difficulty. The expenditure charged to capital was larger than for some years past; the sum expended being £26,504. The greater part of this was for additional manufacturing plant at the Litchurch Works. Last year they had a very large increase in the demand for gas, especially for industrial purposes. The increase in 1917 over the previous year was 195 million c.ft.; and last year, notwithstanding lighting restrictions, there had been a further increase of 89 millions. Work on new plant had therefore to be pushed on. The sum of £10,440 had been written off depreciation of stoves and meters. The expenditure for coal was £145,146; being an increase of £23,169 upon last year, although the quantity carbonized was 899 tons less. In the pre-war year (1913) they paid for coals £60,163; the quantity used being 100,664 tons, as compared with £145,146 for 126,523 tons last year. The wages bill had increased from £27,298 in 1914 to £54,013 in 1918. The sum of £54,350 was expended on repairs, maintenance, and renewals, and, in addition, £10,000 from undivided profits had been expended on special renewals. The expenditure on distribution was £28,826. The total expenditure was £261,379; being £50,694 more than the previous year. The quantity of gas sold, although consumers were subject to rigid lighting restrictions, showed a substantial increase, due entirely to the much larger quantity used for industrial purposes. The total was 1362 million c.ft. The present price was 3s. per 1000 c.ft. The rentals for gas were £162,749; and residual products, after deducting expenses of manufacture, amounted to £109,436—an increase of £13,000. The profit for the year was £32,732: being £6000 less than last year. The report and the dividend of 5¼ p.ct. were adopted.

Gas-Works Transfer Proposed at Barnsley.—The Barnsley Town Council are considering the possible purchase of the local gas-works undertaking, which has a capital of £100,000. Though no official statement has so far been made, it is understood that the Council, at a meeting last week, decided in Committee to further consider the matter.

Forty-Seven Hour Week at Halifax.—Upon the recommendation of the Gas Committee, the Halifax Borough Council, at their last monthly meeting, approved a suggestion that the working hours of all the employees at the gas-works be reduced from 48 to 47 per week, so as to bring them into line with the agreement entered into between the Halifax and District Engineering Employers' Association and the Halifax and District Joint Engineering Trades. The apportionment of the hours is to be Monday to Friday, 8 a.m. to 12.30 p.m., and 1.30 p.m. to 5.30 p.m.; Saturday, 7.30 a.m. to noon.

Lighting of Banff.—The Banff Town Council have had an animated discussion in connection with a motion to proceed with an electric lighting scheme. Bailie Murray stated that the price of gas at Banff was higher than elsewhere within a certain radius, and the quality poor. Bailie Cumming said that a scheme was prepared some years ago, but had been held over during the war. He considered something ought to be done for the better lighting of the town. It was pointed out by the Clerk that the Reconstruction Committee of the Government did not encourage the establishing of small uneconomical plants for electricity, but desired the erection of large central stations. All the Town Council were appointed a Committee, with the Provost as Convener, to take into consideration the subject of better lighting.

Halifax Gas Engineer's Salary.—Considerable discussion arose at the monthly meeting of the Halifax Borough Council last Wednesday week upon a proposal by the Gas Committee to increase the salary of the Gas Engineer and Manager (Mr. W. B. M'Lusky) from £800 to £900 per annum. Mr. J. H. Mackrell proposed that the minute be referred back to the Committee, maintaining that under present circumstances Mr. M'Lusky was being paid a sufficiently large salary. The amendment was seconded; but Mr. J. H. Waddington (the Chairman of the Gas Committee) eloquently urged the claims of Mr. M'Lusky to the suggested increase. He eulogized the Engineer as a chemist and inventor, and stated that Mr. M'Lusky had saved the town £150 by one invention last year. He could not understand the Council quibbling at £100 a year, when they knew they had a good Engineer; that if he went elsewhere he could probably secure a more remunerative salary; and that gas was produced so cheaply in Halifax. It was pointed out by a member of the Gas Committee that the recommendation had only been passed by a majority of one in committee. Upon the amendment being put to the Council, it was adopted, and the matter referred back to the Committee.

Fatality at the Margate Gas-Works.—What was declared to have been the first fatal accident at the works at Margate of the Isle of Thanet Gas Company since they were started 95 years ago, was recently the subject of an inquiry by the Borough Coroner—a man named Alfred Pilcher, a stoker, having been killed while working a lift. While ascending, the lift suddenly came to a stop; and on investigation, deceased was found across a girder, and inside the well of the lift, a 15 cwt. weight being on his neck. He had gone up to oil the bearings; and the men had had strict orders not to do this while the machinery was running. Mr. J. M. Campbell (the Engineer and General Manager) said Pilcher had been for many years in the Company's employ, and was held in the highest respect as a good workman and a good servant in every way. It was no part of deceased's work to attend to the lubricators, beyond screwing them down as occasion required, which should not be done when the lift was in motion; and it was contrary to orders to go on to the landing at such a time. The lubricator could be reached from the level of the platform, and without leaning over the girder. Speaking generally as to the working of the lift, he described it as in excellent condition, and provided with all the necessary appliances for safe working. A verdict was returned of "Accidental death;" the Coroner remarking that he could see no neglect on the part of the Company as to safeguards, though further precautions could be taken to protect the men against themselves.

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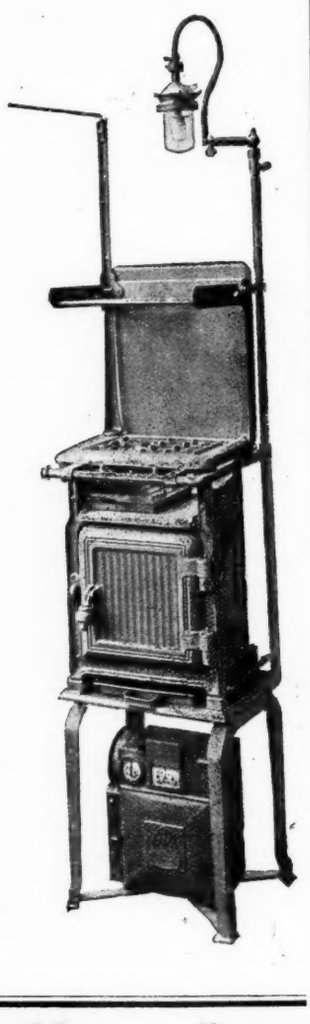
Cooker on Stand.
Plate Rack and Enamelled Backplate.
Towel Rail.
Inverted Incandescent Burner,
and Connection for Extensions.



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Gas-Main Escape Fatality at Bristol.—Last Saturday week, a Bristol labourer, named Baxter, aged 55, lost his life through an escape of gas from the main outside the house in which he lived. There was recently detected a pungent smell of gas in the house; but the jet in the room was safely turned off. The gas, a witness at the Coroner's inquest said, escaped from a burst pipe in the street. The Superintendent of Mains of the Bristol Gas Company stated that the leak was due to frost. Medical evidence showed that death was due to coal gas poisoning, and a verdict to this effect was returned.

Reduced Sales at Bournemouth.—At the meeting on Friday, the Directors of the Bournemouth Gas and Water Company will report that the results for the past six months have been adversely affected by the continued high cost of materials and labour. In addition, the statutory restrictions on consumption have caused a reduction in the sales of gas of 16 p.ct. The balance of profit and loss account is £39,010, including £23,565 brought forward; and the Directors recommend payment of the statutory dividends, less income-tax, at the rates of 7 p.ct. per annum on the "B" ordinary shares, and 12 p.ct. per annum on the original shares. This will leave a sum of £19,151 to be carried forward.

Oil Recovery Syndicate.—The money article in the "Evening Standard" last Thursday contained the following paragraph: Some time ago we stated that negotiations were going on in connection with patents for the treatment of coal and the cheap production of electricity. The reference concerned the taking-over of the Tarless Fuel Company's patents by the Oil Recovery Syndicate. We now understand that this Syndicate, which has a capital of £75,000 in 1,500,000 shilling shares, intends increasing same to £150,000 in 3,000,000 shares of 1s. each. The General Electric Company is interested in the Oil Recovery Syndicate.

Quality of Gas in the City.—The City Corporation have decided to communicate with the Board of Trade concerning the inconvenience and extra expense to which residents and business people in the City are put by reason of the continued inferior illuminating and calorific power, purity, pressure, &c., of the gas supplied by the Gas Light and Coke Company, notwithstanding greatly increased charges. In view of the fact that the necessity for extracting from the gas products valuable for the prosecution of the war has disappeared, the Board are asked to take early action to secure that the standards prescribed by Statute are complied with by the Company.

STOCK MARKET REPORT.

DURING the past week the Stock Exchange was not able wholly to maintain the level in point of time which was attained in the week before. It certainly did open with a disposition to regard the labour problem with diminished apprehension, and many markets displayed an almost cheerful air. But later developments cast a shadow over the position, and the last half of the week exhibited dulness, though not all departments were affected alike.

In the gilt-edged quarter, Home Government issues kept up remarkably well. The 5 p.ct. War Loan marked 95 1/16 repeatedly on Friday, and the 3½ p.ct. was firm. War Bonds, too, were in good demand, and Indian were steady. Home Rails were subjected to a great deal of realization, and closed quite dull. Canadians were in good case, and made a nice improvement; but Argentines were dull. The Foreign Market was not so attractive as in the previous week. French Loans opened well, but later they developed irregularity, and finally closed easy. Chinese, Japanese, and Brazilian were among the firmest. Among the Miscellaneous, Oil was in good request, and Breweries and Iron and Steel concerns enjoyed favour.

Business in the Gas Market showed an improvement in animation, and the aggregate of transactions marked was more numerous than that of the week before. No issues in particular monopolized an unfair share of the business; and it was fairly enough distributed through the list. The prices realized indicated general steadiness. Gas Light and Coke was firm (to which the Governor's able speech at the general meeting contributed) and promptly marked 68½ *ex div.* for the ordinary stock. Other Metropolitan and Suburban issues dealt in were steady. Imperial Continental was unchanged. South Suburban preference now disappears from the list, having been converted into 5 p.ct. debenture stock. In Sheffield, the three "A," "B," and "C" 10 p.ct. issues have been converted into equivalent values of 5 p.ct., and are quoted at similarly corresponding prices.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 68½, 69, 69½, 70, ditto preference 71½, ditto debenture 57, Imperial Continental 118½, 119, 120, South African 13 7/16, South Metropolitan 73, 73½, 74. On Tuesday, Brentford debenture 64½, British 32½, 32⅝, Commercial 3½ p.ct. 60, Gas Light preference 71½, 72, Imperial Continental 119, 120, 120½, Primitiva preference 60s., South African 13⅝, South Metropolitan 73. On Wednesday, Bombay 6 3/16, Brentford "A" 79½, Gas Light ordinary 69, 69½, 69⅝, ditto maximum 57½, ditto preference 71, Ilford "A" 93, ditto "B" 71, Imperial Continental 119½, 120, Ottoman 5 1/16, 5⅛, Primitiva preference 60s., South Metropolitan 73, 74. On Thursday, Commercial 4 p.ct. 64, 64½, Gas Light ordinary 68, 68½, *ex div.*, ditto preference 71 *ex div.*, ditto debenture 56, 56⅛, Ilford "A" 94, ditto "B" 71, Imperial Continental 119½, 120¼, Newcastle 72½, South Metropolitan 72 *ex div.*, Tottenham "A" 93, ditto "B" 67. Cardiff 5 p.ct. maximum 84⅛. On Friday, Bombay 6 1/16, European 13 1/16, Gas Light ordinary 67½, ditto preference 70½, 70⅝, ditto debenture 56½, Imperial Continental 119, 119⅛, 119⅜, 120¼, 120½, Monte Video 9½, 9⅝, Oriental 104¼, South Metropolitan 71, 71⅛.

The Money Market was very firm throughout the week; the demand increasing towards the close. The Bank rate is 5 p.ct., as fixed on April 5, 1917.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares.	When ex-Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	63—67	..
1,551,868	"	April 8	2½	4⅛%	Alliance & Dublin Ord.	59—64	48—50	..
874,000	"	July 10	4	4%	Do. 4 p.c. Deb.	76—79	61—63	..
280,000	5	April 29	7½	8%	Bombay, Ltd.	5⅞—6⅛	5⅝—6	6 1/16—6 3/16
60,000	10	Feb. 26	16	11%	Bournemouth Gas and Water { 10 p.c.	26—30	23—24	..
888,110	10	"	7	7%	B 7 p.c.	15—15½	10¾—11½	..
115,000	10	"	6	6/-	Pref. 6 p.c.	13½—14	9½—9⅝	..
159,740	—	—	—	4%	4 p.c. Deb.	..	66—68	..
999,045	Stk.	Feb. 26	14	37/-	Brentford A Consolid.	261—266	76—79*	79½
734,990	"	"	11	31/3	Do. B New	204—209	70—75*	..
55,000	"	"	5	5%	Do. 5 p.c. Pref.	109—111	75—80*	..
221,400	"	June 11	4	4%	Do. 4 p.c. Deb.	91—93	62—64	64½
217,880	"	Feb. 26	11	8⅛%	Brighton & Hove Orig.	208—213	140—145	..
244,300	"	"	8	5⅛%	Do. A Ord. Stk.	154—159	97—102	..
983,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Mar. 26	12½	22/6	British	44—45	31½—32½	32½—32⅝
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	60—63	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	3/8—1½	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	7/8—3/4	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79—81	..
1,513,380	"	Feb. 12	5/9/4	36/-	Commercial 4 p.c. Stk.	106—108	62—67	64—64½
560,000	"	"	5½	30/-	Do. 3½ p.c. do.	103—105	58—63	60
475,000	"	June 11	8	8%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	"	"	4	—	Continental Union Ltd.	76—79	48—53	..
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	70—75	..
51,600	Stk.	Aug. 29	14½	12½%	Croydon A 10 p.c.	..	160—170	..
278,400	—	"	11½	9⅜%	Croydon B and C 7 p.c.	..	135—140	..
492,270	Stk.	"	6	6¼%	Derby Con. Stk.	123—126	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,002,180	10	July 29	10	5/0	European, Ltd.	17½—18	12—14	12½
16,298,975	Stk.	Feb. 10	4/17/4	80/-	Gas Light and Coke { 4 p.c. Ord.	96—102	67—69*	67⅝—70
2,600,000	"	"	8½	26 8	8½ p.c. max.	76—79	55—57*	57⅛
4,069,285	"	"	4	4%	4 p.c. Con. Pref.	96—99	69—70*	70½—72
4,674,850	"	June 11	8	8%	8 p.c. Con. Deb.	72½—74½	56—53	56—57
180,000	"	"	10	10%	10 p.c. Bonds	..	..	..
82,500	"	Mar. 12	5	4½%	Hastings & St. L. 5 p.c.	..	60—65	..
258,740	"	—	3½	2⅜%	Do. 3½ p.c	37—39	45—50	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16½	7½—8½	..
86,600	Stk.	Sept. 12	9	9%	Hornsey 7 p.c.	..	117—122	..
131,000	"	Mar. 12	7½	6⅝%	Ilford A and C.	151—154	92—97	93—94
65,780	"	"	6⅜	4⅜%	Do. B	115—118	70—75	71
65,500	"	June 26	4	4%	Do. 4 p.c. Deb.	92—94	62—65	..
4,940,000	"	May 14	9	4½%	Imperial Continental	150—160	117—122	118½—120½
1,386,000	"	Feb. 12	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	72—74*	..
286,242	"	Mar. 12	6⅜	6¼%	Lea Bridge Ord. 5 p.c.	119—121	93—98	..
2,498,905	"	Feb. 26	10	5%	Liverpool 5 p.c. Ord.	211—213	..	..
806,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	146—148	..	..
165,736	"	Aug. 15	4½	4½%	Maidstone 5 p.c.	..	60—65	..
75,000	5	June 11	8	8%	Malta & Mediterranean	4½—4⅝	3½—3⅝	..
250,000	100	April 1	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	90—97	..
841,990	20	May 26	4	6/-	Monte Video, Ltd.	11½—12	9½—9⅝	9½—9⅝
1,875,893	Stk.	July 29	4½	8½%	Newcastle&Gatsh'd Con.	98½—99½	72—73	72½
539,705	"	June 26	8½	8½%	Do. 8½ p.c. Deb.	82—88	57—59	..
55,940	10	Feb. 26	7/14/0	7½	North Middlesex 7 p.c.	14—15	9½—10½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	103—105	104½
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7⅝	4⅝—5½	5 1/16—5⅛
60,000	50	Feb. 26	18	7½%	Portsea, Island B	128—131	78—88	..
100,000	50	"	12	6½%	Do. C	118—121	60—65	..
849,980	5	April 29	8	—	Primitiva Ord.	5½—6	1⅜—2½	..
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4½—5	3—3½	60/-
521,800	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	74—76	..
600,000	Stk.	July 31	4	4%	Do. " 1911	..	46—49	..
846,198	"	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	55—60	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref.	10½—11	7⅜—8½	..
195,000	50	July 1	5	5%	5 p.c. Deb.	47—49	40—43	..
185,000	Stk.	Mar. 12	10	5%	Sheffield A	238—234	85—87	..
209,984	"	"	10	5%	Do. B	222—224	85—87	..
528,500	"	"	10	5%	Do. C	230—232	84—86	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	May 26	9	6/-	South African	10½—11½	13—14	13 7/16—13⅝
6,609,295	Stk.	Feb. 10	5/4/0	80/-	South Met. 4 p.c. Ord.	111—113	71—73*	71—74
250,000	"	July 12	—	5%	Do. Pref.	..	94—96	..
1,895,445	"	July 10	8	8%	Do. 3 p.c. Deb.	72½—74½	54—56	..
224,820	"	Feb. 26	8½	6%	South Shields Con. Stk.	157—159	114—116	..
962,796	"	"	6	3⅛%	S'th Suburb'n Ord. 5 p.c.	114—116	77—80	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	89—92	..
647,740	"	May 14	7½	3%	Southampton Ord.	99—102	67—70	..
190,000	"	Feb. 12	7½	5⅛%	Tottenham { A 5 p.c.	135—138	92—97	93
789,275	"	"	6	4%	District { B 3½ p.c.	115—117	67—69	67
181,255	"	June 26	4	4%	4 p.c. Deb.	87—89	64—66	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	108½—109	87—88	..
80,000	"	Feb. 26	8⅜	63/9	Wandsworth, Wimbledon, and Epsom— Wandsworth A 5 p.c.	151—156	90—95	..
255,686	"	"	6⅞	48/9	Do. B 3½ p.c.	129—134	70—75	..
359,000	"	"	6⅜	42/6	Wimbledon 5 p.c.	117—122	70—75	..
98,000	"	"	6⅝	48/9	Epsom 5 p.c.	121—126	72—77	..
88,416	"	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—52	..

* *Ex div.*

Wandsworth, Wimbledon, and Epsom District Gas Company.

The Directors will report at the meeting next Tuesday that the sale of gas for the half year ended Dec. 31 shows a decrease of 9·08 p.ct. as compared with the corresponding period of 1917, which is undoubtedly due to the restrictions arising under the Household Fuel and Lighting Order. The Directors, as was mentioned in the last report, were compelled by the rise in wages and materials to increase the price of gas by 3d. per 1000 c.ft. from Michaelmas last. The revenue account shows a profit of £30,518; and after providing for the interest on debenture stock and mortgages, and on deposits and loans, there remains to the credit of the profit and loss (net revenue) account an amount of £20,261. The Directors therefore recommend that dividends be declared at the statutory rates, as follows: On the Wandsworth "A" stock, 5½ p.ct.; on the Wandsworth "B" stock, 4 p.ct.; on the Wandsworth "C" stock, £3 17s. p.ct.; on the Wimbledon stock, £3 7s. 6d. p.ct.; on the Epsom stock, 4 p.ct.; and on the new ordinary stock, £3 17s. p.ct. per annum. As the dividend on the Wimbledon stock, under the sliding-scale, has fallen by 7s. 6d. below the three-fourths of the standard dividend, which the Board of Trade are, by an Order under the Statutory Undertakings (Temporary Increase of Charges) Act, 1918, enabled to sanction, an application was made for an Order to pay at the rate of £3 15s. p.ct. per annum. It was, however, refused; it being held that the Company's Act, providing for varying dividends on various classes of stock, does not admit of a single class of stock obtaining the relief sought.

Gas-Works and Demobilization.—In view of the serious difficulties occasioned by the shortage of labour at the gas-works, the Dewsbury Corporation have passed a resolution urgently requesting the early demobilization of all men formerly employed at such works, and directing the Town Clerk to take the necessary steps to obtain their release.

Irish Gas-Works Employees.—The Maryborough (Queen's county) Gas Company, whose employees struck work for an increase of 12s. in wages and an eight-hour day, have conceded the latter, and granted an increase of 6s. The threatened strike of gas-workers in Cork has been averted—an amicable settlement being arrived at on the points in dispute.

Daylight Saving in France.—In France, all clocks will be advanced an hour on March 1; and "old time" will be resumed on Oct. 8. It has been calculated that the cash saving this year will amount to roughly £4,000,000 in lighting. Last year, the saving was between £2,800,000 and £3,000,000. In peace time, with the lower cost of fuel, the saving which may be realized would come to about £1,500,000 to £2,000,000.

Less Gas Sold at Croydon.—A falling off of close upon 10 p.ct. in the quantity of gas sold in the past half year, as compared with the corresponding period of 1917, is attributed by the Directors of the Croydon Gas Company mainly to the operation of the Household Fuel and Lighting Order. After providing for all fixed charges, there remains available for division a balance of £24,413; and at the meeting on Friday, the declaration of the statutory dividends will be proposed, which will leave a sum of £3673 to be carried forward.

Sunderland Town Council and the Gas Company's Bill.—The Sunderland Town Council have unanimously decided to oppose the Gas Company's Bill. The chief point of the opposition is that the Company propose to extend their area beyond the borough boundary. It is pointed out that, if they are empowered to do this, difficulty might arise in the future should the Corporation decide to take over the undertaking. The Bill also contains a provision to enable the Company to charge 1d. per 1000 c.ft. extra, in order to create a fund to provide their employees with bonuses and pensions. This fund the Council hold should be provided out of the profits.

York Gas Company.—The report just issued deals with the seventy-fourth year's working of the York Gas Company, and in it the Directors state that the profit for the twelve months ended Dec. 31 amounts to £13,069; and adding the balance of net revenue brought forward, there is a total to credit of profit and loss of £21,441. The Board recommend the payment of a dividend on the consolidated ordinary stock making £3 12s. p.ct. for the year (less tax), which will leave a sum of £9594 to be carried forward. The quantity of gas sold during the year was 552,717,300 c.ft., or an increase of 9,403,300 c.ft. A resolution will be submitted to the meeting to-morrow (Wednesday) to place the sum of fifty guineas at the disposal of the Directors for extra services in connection with the "financial hardships" inquiry, and the Bill promoted by the Company to secure relief.

Batley Corporation Accounts.—The abstract of accounts of the Batley Corporation trading departments for the year ending March 31, 1918, publication of which has been delayed by war conditions, shows a net profit on the gas-works of £132, as against a deficit at the end of the previous year of £438. Out of this profit, however, £50 has been transferred to relief of rates; and the deficiency, therefore, is reduced only to £356. The gain on the department, though small, is gratifying, in view of the conditions of the times. Costs increased; and the sale of gas was reduced by 3 million c.ft.

Uxbridge Gas Company.—The statutory dividend of 4½ p.ct. for the year (less income-tax) on the consolidated stock was declared at the annual meeting of the Uxbridge Gas Company, when Mr. H. E. Jones, who presided, congratulated the shareholders upon having got through the year as they had done, in spite of the Coal Controller having interfered with their supplies of coal, and in spite also of the restrictions placed upon the sale of gas. After paying the dividends, he was pleased to say that they had a surplus of roughly £2400. The gas restrictions had been responsible for a decline of only 2·7 p.ct. in the consumption. The future of their Company was well assured; but he warned them that there would be a phase of labour trouble which in his opinion was the result of the unprepared condition of the country for war. There was a further increase in the price of gas of 4d. per 1000 c.ft. as from last Midsummer quarter.

Quality of Plymouth Gas.—Several questions with reference to the quality of the gas supplied by the Plymouth Gas Company were asked at the meeting of the Town Council yesterday week. They were answered by the Town Clerk, who said that under the Plymouth and Stonehouse Gas Act, 1916, a calorific standard was substituted for illuminating power. No regular tests of the gas have been made by the Corporation since July of that year. The testing was suspended on the suggestion of the Ministry of Munitions, consequent upon the extraction of benzol and toluol. The Ministry have now notified gas companies generally that the scrubbing of gas for toluol and benzol need no longer be continued, so far as the Department are concerned. No discussion took place in the Council as the result of this information; but in the local Press the Corporation are urged to take measures to improve the gas, now that the extraction of toluol and benzol is not needed in the national interest.

Mr. W. A. Bolt, the Midland and Eastern Counties representative of the Bland Light Syndicate, Ltd., after serving in France for two-and-a-half years, has now been demobilized, and resumed his duties.

Plans have been prepared by the Gas Manager at Burntisland for the erection of new gas-works. An excellent site is available; and a Committee have been appointed by the Gas Commissioners to investigate the matter.

The Walsall Gas Committee report that they consider it desirable that boys who are working with the gas-fitters of the Corporation should attend the evening classes at the Technical Institute for technical training in gas-fitting; and the Engineer (Mr. B. W. Smith) has been instructed to arrange accordingly. The Institute fees will be paid by the Corporation.

A special conference will be held under the auspices of the Industrial Reconstruction Council, on Thursday, the 27th inst., at 5.15 p.m., in the Hall of the Institute of Journalists, Nos. 2 & 4, Tudor Street, E.C., when an address will be given by Major Pells, R.E. (Assistant Director, Efficiency and Costs Section, Ministry of Munitions), on "Scientific Management in Industry." The lecture will be followed by a discussion. No tickets are necessary.

The Gas Committee of the Bradford City Council report that they proceeded to the Valley Road gas-works, and after inspecting the benzol plant erected by the Government resolved that the offer of the Ministry of Munitions to sell to the Corporation the plant for the sum of £4792 (being one-half the cost of construction) be accepted. The Town Clerk was instructed to make application for the sanction of the appropriate Government Department to the borrowing of the necessary money.

Lieutenant F. I. Rogers has been appointed Messrs. Arden Hill & Co.'s representative for the North-Eastern Counties. He volunteered for service directly after the outbreak of war, and was attached to the Royal Air Force as an Observer Flying Officer. At the offensive in August last, he was taken prisoner over the enemy lines, and was interned in a German camp until his release in December. Before volunteering for service, he had charge of Messrs. Arden Hill & Co.'s interests in Lancashire.

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